SonoSite™ Hand-Carried
Ultrasound System
Service Manual

SonoSite
Imagine What You Can Do

:

P00715-02 Rev A 4/00

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CAUTION: United States federal law restricts this device to sale by or on the order of a physician.

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CHAPTER 1

Introduction

Before servicing the SonoSite ultrasound system, read and be familiar with the information in this manual.

1.1 Description

The SonoSite system is a portable, software-controlled, ultrasound system, which has an all-digital architecture. It is used to acquire and display high-resolution, real-time, 2D, Color Power Doppler (CPD), and PowerMap Directional Color Power Doppler (DCPD) ultrasound images.

The system has cine review, image zoom, labeling, measurement and calculations, image storage and review, printing and recording capabilities. Currently, the system supports the following transducers:

- a C60/5-2 MHz 60-mm, curved array
- a C15/4-2 MHz 15-mm, curved array
- an ICT/7-4 MHz 11-mm, intracavitary array

1.2 System Components

The SonoSite system comprises the following components:

- a hand-carried ultrasound system
- a transducer
- a power supply

The SonoSite system may include the following optional accessories:

- SiteStand mobile docking station
- SiteCharge dual battery charger

- SitePack protective carrying case
- Power supply (extra)
- Battery (extra)
- Video cable
- Printer control cable
- Power cord
- AIUM Ultrasound Medical Safety Guidance document
- User Guide

1.3 Peripherals

The SonoSite system peripherals include both medical grade (conform to the requirements of EN60601-1) and non-medical grade (commercial) products. Use of the peripherals is covered in the manufacturers' instructions, which accompanies each peripheral.

1.3.1 Medical Grade

The SonoSite system may include the following medical grade peripherals:

- a video cassette recorder (VCR)
- a video printer
- a monitor (external)

1.3.2 Non-medical Grade (Commercial)

The SonoSite system may include the following non-medical grade (commercial) peripherals:

- a digital video recording/playback product
- a monitor (external)

1.4 Audience

The intended audience of this manual is properly trained field and in-house service personnel.

1.5 Conventions Used in This Manual

These conventions are used in this manual:

- Control names and references to display elements are presented in **bold-face** type.
- Operating instructions are introduced with a statement in **bold-face** type that ends with a colon. For example: **To read this user guide:**

- When the steps in the operating instructions must be performed in a specific order, the steps are numbered.
- Bulleted lists present information in a list, they do not imply a sequence.
- Screen display text is shown in Arial 10 pt. For example: Successful upgrade.
- The left side of the system is to your left as you face the system. The system handle is at the top of the system, the battery compartment is at the bottom of the system.
- *Note: A note draws attention to information that is a general rule for a procedure or is an exception to a rule (noncritical information of general interest).*

1.6 About the System Software

The SonoSite system contains software that controls its operation. From time to time, SonoSite provides new software for use with the system.

Transducers that you receive from SonoSite may include new software for the SonoSite system. This software may be either required or optional.

When the new software is required, you must install it if you wish to use the new software features (e.g., new transducer). If you choose not to install it, you must remove the transducer and replace it with one that is compatible with the software that is currently installed in the system.

When the software is optional, you can either install it or choose to use the existing software. If you choose not to install the software, the system will prompt you again whenever the system is started, and whenever the transducer is disconnected and then reconnected to the system.

1.7 Software Licensing

Use of the software that you receive from SonoSite is controlled by a license key. A license key is a number sequence containing exactly 12-digits (decimal).

License keys are obtained from SonoSite or from its authorized representatives. You must obtain one license key for each system that will use the new software. Refer to Section 1.8, *Obtaining A License Key*, on page 4 for information on obtaining license keys.

Software that you receive from SonoSite may be installed and will operate for a short period of time without requiring a valid license key. We refer to this period of time as the “grace period.” The grace period is variable.

When you first install the software, the SonoSite system will prompt you for a license key. If you have not yet obtained a valid license key, you can elect to use the software as long as the grace period time has not been fully consumed. We refer to this mode of operation as “running in the grace period.”

When the system is running in the grace period, all system functions are available. As you use the system, the grace period is slowly consumed. When the grace period

has expired, the system will not be usable until a valid license key has been entered. Grace period time is not consumed while the system is powered off or when it is in "sleep" mode. Whenever the system is running in the grace period, the grace period time remaining is available on the license update screen.

CAUTION: When the grace period expires, all system functions except for licensing will become unavailable until a valid license key is entered into the system.

1.8 Obtaining A License Key

To obtain a license key, do one of the following:

- Connect to SonoSite on the World Wide Web at www.sonosite.com.
- Contact SonoSite technical support:
  - For U.S. customers, call 1-888-482-9449, extension 2513 (toll-free).
  - For international customers, call 1-425-951-1330 or contact your local representative.

To receive a license key, you must provide the following information:

- License Update number
- ARM Ver: (version)
- PCBA Serial No: (number)

Note: This information is displayed on the license information screen of the system. See ***Chapter 4.5.3, Displaying the License Information Screen,*** *on page 35. If the system is on and the grace period expires, the license information screen is displayed from the system information screen.*

CHAPTER 2

Safety

Please read this information before using the SonoSite ultrasound system. It applies to the ultrasound system, transducers, peripherals, and accessories.

A ***WARNING*** describes precautions necessary to prevent injury or loss of life.

A ***CAUTION*** describes precautions necessary to protect the products.

2.1 Electrical Safety

This system meets EN60601-1, Class I/internally-powered equipment requirements and Type BF isolated patient-applied parts safety requirements.

This system complies with the applicable medical equipment requirements published in the Canadian Standards Association (CSA), European Norm Harmonized Standard, and Underwriters Laboratories (UL) safety standards. See **Chapter 3.6,** *System Specifications.*

For maximum safety observe the following warnings and cautions:

WARNINGS:

Under certain circumstances, the transducer connector and back of the display enclosure can reach temperatures that exceed EN60601-1 limits for patient contact, therefore only the operator shall handle the system. This does not include the transducer face. Patient contact with hot surfaces may result in discomfort or minor risk of patient injury.

To avoid discomfort or minor risk of operator injury when handling the transducer connector, the system should not be operated for more than 60 minutes continuously in a live-scan mode (as opposed to freeze or sleep modes.)

Do not operate the system in the presence of flammable gasses or anesthetics. Explosion can result.

Shock hazards exist if the AC power adapter is not properly grounded. Grounding reliability can only be achieved when equipment is connected to a receptacle marked "Hospital Only," "Hospital Grade," or the equivalent. The grounding wire must not be removed or defeated.

To avoid the risk of electrical shock, before using the transducer, inspect the transducer face, housing, and cable. Do not use the transducer, if the transducer or cable is damaged.

To avoid the risk of electrical shock, always disconnect the AC power adapter from the system before cleaning the system.

To avoid the risk of electrical shock, do not use any transducer that has been immersed beyond the specified cleaning or disinfection level. See ***Chapter 5,*** *Cleaning and Disinfecting*.

To avoid the risk of electrical shock and fire hazard, inspect the AC power adapter cord and plug on a regular basis. Ensure they are not damaged.

Connection of peripherals not recommended by SonoSite could result in electrical shock. Avoid electrical shock hazards by using peripherals and accessory cables recommended by SonoSite.

To avoid the risk of electrical shock, use commercial grade peripherals recommended by SonoSite on battery power only. Do not connect these product to AC mains power when using the system to scan or diagnose a patient/subject. Call SonoSite technical support or your local representative for a list of the commercial grade peripherals available from or recommended by SonoSite.

The transducer must be removed from patient contact before the application of a high-voltage defibrillation pulse.

CAUTIONS:

Although your system has been manufactured in compliance with existing EMI/EMC requirements, use of the system in the presence of an electromagnetic field can cause degradation of the ultrasound image. If this occurs often, SonoSite suggests a review of the system environment. Identify and remove the possible sources of the emissions or move your system.

Electrostatic discharge (ESD), or static shock, is a naturally occurring phenomenon. ESD is common in conditions of low humidity, which can be caused by heating or air conditioning. Static shock is a discharge of the electrical energy from a charged body to a lesser or non-charged body. The degree of discharge can be significant enough to cause damage to a transducer or an ultrasound system. The following precautions can help reduce ESD: anti-static spray on carpets, anti-static spray on linoleum, and anti-static mats.

Do not use the system if an error message appears on the image display: note the error code; call SonoSite technical support or your local representative; turn off the system by pressing and holding the power switch until the system powers down (6-10 seconds).

2.1.1 Equipment Protection

To protect your ultrasound system, transducer, and accessories, follow these precautions.

CAUTIONS:

Excessive bending or twisting of cables can cause a failure or intermittent operation.

Improper cleaning or disinfecting of any part of the system can cause permanent damage. For cleaning and disinfecting instructions, see **Chapter 5,** *Cleaning and Disinfecting*.

Do not submerge the transducer connector in solution. The cable is not liquid-tight beyond the transducer connector/cable interface.

Do not use solvents such as thinner or benzene, or abrasive cleaners on any part of the system.

Remove the battery from the system if the system is not likely to be used for some time.

Do not spill liquid on the system.

The top membrane of the phantom is delicate and can be damaged if handled improperly. Only use minimum force when coupling the transducer to the phantom.

Do not handle PCBs without proper static protection. Damage to components may result from improper handling.

Damage to the system may occur if the system is incorrectly assembled, configured or the system is connected to an improper power source.

Do not touch the scanhead connector pins.

2.2 Battery Safety

Observe the following, to ensure that the battery does not burst, ignite, or generate heat or fumes.

WARNINGS:

The battery has a safety device. Do not disassemble or alter the battery.

Charge the batteries only when the ambient temperature is between 0° and 40°C (32° and 104°F).

Do not short-circuit the battery by directly connecting the positive and negative terminals with metal objects.

Do not heat the battery or discard it in a fire.

Do not expose the battery to temperatures over 60°C (140°F). Keep it away from fire and other heat sources.

Do not charge the battery near a heat source, such as a fire or heater.

Do not leave the battery in direct sunlight.

Recharge the battery only with the SiteCharge dual battery charger or the system.

Do not pierce the battery with a sharp object, hit it, or step on it.

Do not use a damaged battery.

Do not solder a battery.

When connecting the battery to the SiteCharge dual battery charger or to the system, never reverse the polarity of the battery terminals.

The polarity of the battery terminals are fixed and cannot be switched or reversed. Do not force the battery into the system or the SiteCharge dual battery charger.

Do not connect the battery to an electrical power outlet.

Do not continue recharging the battery if it does not recharge within 6 hours.

CAUTIONS

To avoid the battery bursting, igniting, or fumes from the battery, observe the following precautions.

Do not immerse the battery in water or allow it to get wet.

Do not put the battery into a microwave oven or pressurized container.

If the battery leaks or emits an odor, remove it from all possible flammable sources.

If the battery emits an odor or heat, is deformed or discolored, or in any way appears abnormal during use, recharging or storage, immediately remove it and stop using it. If you have any questions about the battery, call SonoSite technical support or your local representative.

Store the battery between -20°C (-4°F) and 60°C (140°F).

Use only SonoSite batteries.

2.3 Biological Safety

Observe the following precautions related to biological safety.

WARNINGS:

Non-medical (commercial) grade peripheral monitors have not been verified or validated by SonoSite as being suitable for diagnosis.

Do not use the system if it exhibits erratic or inconsistent behavior. Discontinuities in the scanning sequence are indicative of a hardware failure that must be corrected before use.

Some transducer covers contain natural rubber latex and talc, which can cause allergic reactions in some individuals. Refer to the FDA Medical Alert, March 29, 1991.

Perform ultrasound procedures prudently. Use the ALARA (as low as reasonably achievable) principle.

SonoSite does not currently recommend a specific brand of acoustic standoff.

2.4 Labeling Symbols

Table 2.1 lists the following symbols that are found on the products, packaging, and containers.

Table 2.1 Labeling Symbols

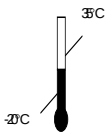
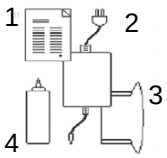
SYMBOLS	DESCRIPTION
	Do not get wet.
	Type BF patient applied part (B = body, F = floating applied part).
	Indoor use only.
	Storage temperature conditions are between -20°C (-4°F) and 35°C (95°F).
	Direct Current (DC).
	Alternating Current (AC).
	CE marking indicating Manufacturers declaration of compliance with Annex VII of 93/42/EEC.
	CE marking indicating compliance with Annex V and VII of 93/42/EEC certified by the British Standards Institution.
	Underwriter's Laboratories labeling.
	Canadian Standards Agency.

Table 2.1 Labeling Symbols, *Continued*

SYMBOLS	DESCRIPTION
REF	Catalog number.
SN	Serial number type of control number.
LOT	Batch code, date code, or lot code type of control number.
	Collect separately from other household waste (see Commission Directive 93/86/EEC). Refer to local regulations for disposal.
	Attention, see the User Guide.
	Fragile.
	Date of manufacture.
	Caution: hot surface.
 10	Do not stack over 10 high.
	Recycle paper.
IPX 7	Submersible. Protected against the effects of temporary immersion.

Table 2.1 Labeling Symbols, *Continued*

SYMBOLS	DESCRIPTION
IPX 1	Protected against vertically falling raindrops.
	Corrugated recycle.
	Charge battery for 3 hours.
	Brightness icon.
	Contrast icon.
	User Guide (1) Power supply (2) Battery (3) Ultrasound gel (4)
	Electrostatic sensitive devices.

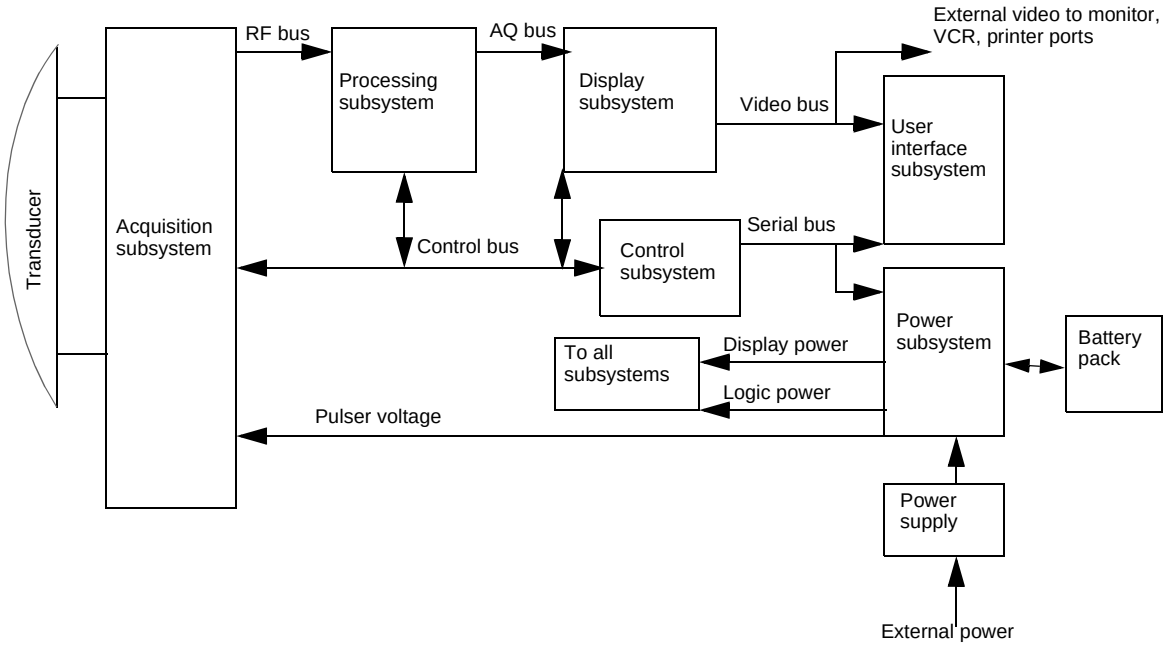
CHAPTER 3

System Overview

3.1 Theory of Operation

The SonoSite ultrasound system has seven major functional groups: the transducer, the acquisition subsystem, the processing subsystem, the display subsystem, the control subsystem, the user interface subsystem, and the power subsystem. Figure 3.1 shows how these functional groups interact.

Figure 3.1 System Block Diagram



3.1.1 Transducer

The transducer elements convert the pulser voltage to acoustic energy during the transmit portion of the ultrasound acquisition cycle. The transducer elements convert the acoustic echo to voltage in the receive portion of the acquisition cycle.The system transducers have 64 or more elements. The voltage developed on the transducer elements is sensed by the acquisition subsystem.

3.1.2 Acquisition Subsystem

The acquisition subsystem consists of a beamformer and an interface to the transducer. The beamformer times the transmit pulses to focus the acoustic beam. The beamformer amplifies the low-level echo signal and times the receive information to focus the receive information.

3.1.3 Processing Subsystem

The processing subsystem interfaces with the beamformer and performs high-speed processing. The processing subsystem demodulates, filters, detects, and compresses the signal supplied by the beamformer; it then supplies this data to the display subsystem.

3.1.4 Display Subsystem

The display subsystem converts the detected ultrasound data into picture elements (pixels). The software user interface graphics are combined with the ultrasound information and converted to a video stream. The external video ports support NTSC and PAL format.

3.1.5 Control Subsystem

The control subsystem consists of the central processing unit, program and video memory, permanent image storage and retrieval memory, and a connection to the user interface keys. The control software includes the acoustic power and intensity software power group monitors, and a beamformer monitor. This software guarantees a level of patient safety by ensuring the system is operating within acoustic power and intensity limits.

3.1.6 User Interface Subsystem

The user interface subsystem comprises the software user interface and the form factor. The software user interface is the interaction between the user and the screen layout components. The form factor is the type of physical buttons, location, and grouping of the buttons and the device size, shape, and weight. Dedicated controls are for high usage activities and are grouped according to user workflow.

3.1.7 Power Subsystem

The power subsystem provides the system power and protects the hardware from destructive or unsafe conditions by detecting failures in the system through hardware and software monitors. Detection of a fault disables the pulser supply, and signals an error to the control subsystem. The power subsystem includes the battery pack and the battery charging electronics.

3.2 Components

The SonoSite system components include a hand-carried ultrasound system, a transducer, and a power supply. The hand-carried ultrasound system contains the system electronics, display, control panel, and battery pack.The transducer contains the transducer, cable, and memory. The power supply conditions the external power so it can be used to power the system and charge the batteries while in the system.

3.3 Controls

Figure 3.2 shows the SonoSite system controls. The numbers correspond to the control names and functional descriptions in Table 3.1.

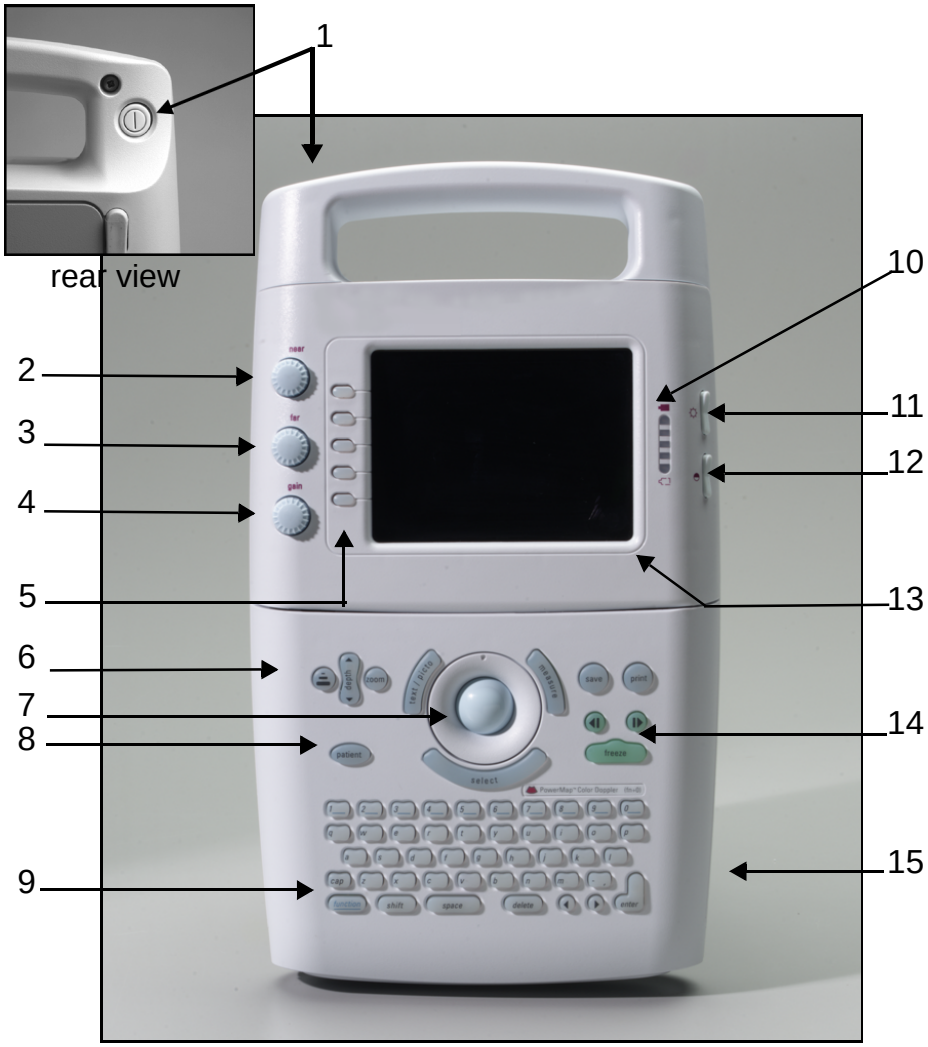


Figure 3.2 SonoSite Ultrasound System Controls

Table 3.1 SonoSite Ultrasound System Controls

NUMBER	CONTROLS	DESCRIPTION
1	power switch (located on the rear of the system handle)	Turns power on and/or off.
2	near	Affects gain of shallow echoes for 2D.
3	far	Affects gain of deeper echoes for 2D.
4	gain	Affects overall gain in 2D and CPD gain in CPD.
5	menu controls	Press patient to access system menus.
6	optimize, depth, and zoom	Provides an image optimization menu; changes the display depth; increases the image size to 2x.
7	trackball	Moves objects on the image display.
8	patient	Displays the system menus.
9	function keys (f1 through f6)	Assigns text for quick labeling of images.
10	battery charge indicators	All LEDs lit indicate a fully-charged battery.
11	LCD (liquid crystal display) monitor brightness control	Controls LCD brightness.
12	LCD monitor contrast control	Controls LCD contrast.
13	LCD monitor	Adjustable liquid crystal display monitor.
14	cine arrows and freeze control	Press to move either way through the cine series of images.
15	battery release	Press to release the battery.

3.4 Accessories

The SonoSite system may include the following optional accessories:

- SiteStand mobile docking station
- SiteCharge dual battery charger
- SitePack protective carrying case
- Power supply (extra)
- Battery (extra)
- Video cable
- Printer control cable
- Power cord
- AIUM Ultrasound Medical Safety Guidance document
- User Guide

3.4.1 SiteStand Mobile Docking Station

The SiteStand mobile docking station provides power, video, and print capabilities for the system (Figure 3.3). It provides the following connections: three video ports, an RS-232C port, a printer control port, and two AC mains IEC power receptacles. It also has storage for two transducers and a tray for a black-and-white printer.

The following adjustments can be made to the system when it is in the docking station. You can tilt the system and adjust the height of the system. In addition, you can adjust the angle of the user interface from 10 to 45 degrees horizontally.

WARNING: To avoid the risk of electrical shock, use commercial grade peripherals recommended by SonoSite on battery power only. Do not connect these products to the AC mains IEC power receptacles on the SiteStand when using the system to scan or diagnose a patient/subject. Contact SonoSite technical support or your local representative for a listing of the commercial grade peripherals available from or recommended by SonoSite.

Figure 3.3 SiteStand Mobile Docking Station

3.4.2 SiteCharge Dual Battery Charger

The SiteCharge dual battery charger can charge two lithium-ion batteries simultaneously (Figure 3.4). It indicates the following states for each battery pack: charging state, charging fault condition, and charged state. It charges a completely discharged six-cell battery in approximately 3.5 hours. The ambient temperature of the SiteCharge dual battery charger should be between 0° to 40°C (32° to 104°F) for charging to be successful.Table 3.2 describes the LED colors and their corresponding system state.

Figure 3.4 Battery Pack with SiteCharge Dual Battery Charger and Power Supply

Table 3.2 Charger LED Colors and System States

CHARGER LED COLOR	SYSTEM STATE
Yellow	The system is charging.
Green	The system is charged.
Flashing yellow	The charger has detected a system fault.

If the charger detects a system fault, the yellow LED on the charger will light. Reseat the battery to clear the fault. If the fault continues, replace the battery pack.

3.4.3 SitePack Protective Carry Pack

The SitePack protective carry pack can transport the SonoSite system, three transducers, accessories, and supplies.

3.4.4 Battery Pack

The system can be powered from either a battery pack or external power.

The system is powered by a rechargeable, six-cell, 11.1 Vdc, 3.0 amp-hours, lithium-ion battery (Figure 3.4). A fully-charged battery has a run time of 1.5 to 4 hours, depending upon operating conditions. The battery pack case is made of injection molded plastic. When in use, it is inserted into the system. The battery pack has no user-serviceable parts.The operating life of the battery ranges from 1-2 years, depending on how you use the system. Table 3.3 contains battery operating specifications.

CAUTION: See protecting against electrostatic discharge in **Chapter 2,** *Safety*.

Table 3.3 Battery Pack Operation Specifications

BATTERY PACK OPERATION PARAMETER	SPECIFICATION
Operation time during use model	2 hours @ 25°C (77°F)
Operation time during power off (leakage and self discharge)	14 days @ 25°C (77°F)
Number of charge discharge cycles (100% depth of discharge)	500 @ 25°C (77°F)

Battery Charge Indicators

The battery charge indicators, which consist of light-emitting diodes (LEDs) on the system, indicate the current battery level.

- All LEDs lit mean the system battery is fully charged.
- Some LEDs lit mean the system battery is partially charged.

CAUTION: Use only the specified SonoSite battery pack.

Table 3.4 contains the charging requirements for the system.

Table 3.4 System Charging Requirements

SYSTEM CHARGING PARAMETER	SPECIFICATION
Charge time to 80% capacity (internal charger) with the system off	3 hours @ 25°C (77°F)
Charge time to 80% capacity (internal charger) with the system on	12 hours @ 25°C (77°F)

3.4.5 External Power

The external power connection provides external power to the system via the power supply. External power charges the battery pack and powers the system in low battery conditions.

3.4.5.1 External System Connections

Figure 3.5 shows the following external system connections:

- An AC line voltage receptacle (1) connects the system to an power supply.
- A remote control receptacle (2) connects the system to a recommended printer.
- A video receptacle (3) provides a composite video signal for a recommended VCR, video printer, or monitor.

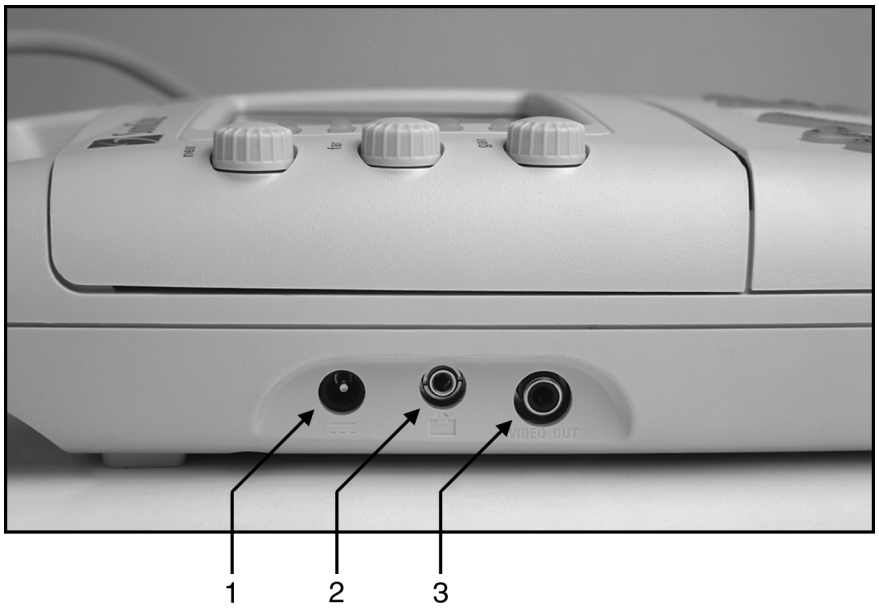


Figure 3.5 External System Connections

3.4.6 Power Supply

CAUTION: Use only the specified SonoSite power supply.

The SonoSite system can be powered by a universal power supply (50–60 Hz, 100–240 VAC). When the system is plugged into a wall outlet, the battery pack simultaneously recharges. Recharging a battery, which is not fully discharged, will not decrease battery life. The ambient temperature shall be between 0° and 40°C (32° and 104°F) to successfully charge a battery. To maintain battery charge, attach the power supply to the system whenever the system is not in use.

Power Cord

The power cord is a North American-style power cord, which is detachable from the power supply.Table 3.5 provides power cord specifications.

Table 3.5 Power Cord Specifications

CONFIGU-RATION	LENGTH	RATING	MALE PLUG	FEMALE CONNEC-TOR	APPRO-VALS	MARKING
100-120 VAC/ 60 Hz	9 ft. 10 in.	250 VAC	MA 5-15P Hospital grade, grounding type molded on	CEE-22, molded on	UL, CSA	Manufac-turer, Agency Approvals
230 VAC / 50 Hz / PAL 230 VAC / 60 Hz	3 m	250 VAC	CEE-7/VII grounding type with 4.8 mm pins molded on	CEE-22, molded on	EU	Manufac-turer, Agency Approvals

3.4.7 Cables

3.4.7.1 Video

The video cable connects the system to the external monitor or video printer. It has RCA-to-BNC connectors.

3.4.7.2 Printer Control

The printer control cable connects the system to the video printer. It has mini-jack to mini-jack connectors.

3.5 Peripherals

CAUTION: Use only the recommended peripherals.

The SonoSite system peripherals include both medical grade (conform to the requirements of EN60601-1) and non-medical grade (commercial) products. Medical grade peripherals may include a VCR, a video printer (black-and-white or color), and a video monitor (external) (Table 3.6). Non-medical grade peripherals may include a digital video recording/playback product and a monitor (external). Read the manufacturer's operating instructions before connecting, operating, or adjusting any peripheral.

Table 3.6 Medical Grade Peripherals

TYPE	DESCRIPTION	NTSC	PAL
VCR	Sony SVO 9500 MD	X	
	Sony SVO 9500 MDP		X
Video printer	Sony UPD890 MD, black-and-white	X	X
	Sony UPD895 MD, black-and-white	X	X
	Sony UP 2900 MD, color	X	X
Video monitor (external)	Sony PVM14M2-MDU, color	X	X

3.5.1 Video

The system has one internal video path and one external video port. The internal video is generated for input to a display. The external video is composite interlaced video.

Any image that displays on the system display module can be recorded on a VCR, printed, or displayed on an external monitor. The external video may be connected to a variety of devices, such as a monitor, video printer, or VCR. The video output is either NTSC or PAL format, which is user-configurable in system setups.

Video Port Cable

The video cable has a 75 ohm impedance and is shielded. The system has an RCA-type jack. Table 3.7 provides video cable signal specifications.

Table 3.7 Video Cable Signal

CONNECTOR PIN	SIGNAL
Center conductor	Video
Shield	Signal ground

3.6 System Specifications

This section provides specifications for the SonoSite ultrasound system.

3.6.1 Physical Dimensions

Height: 13.3 in. (33.8 cm)

Width: 7.6 in. (19.3 cm)

Depth: 2.5 in. (6.35 cm)

Weight: 5.4 lbs (2.46 kg) with the C60/5-2 MHz transducer connected

3.6.2 Monitor

Height: 4.3 in. (10.9 cm)

Width: 3.1 in. (7.9 cm)

Diagonal: 5 in. (12.7 cm)

Brightness control

Contrast control

3.6.3 Transducers

C60/5-2 MHz 60-mm

C15/4-2 MHz 15-mm

ICT/7-4 MHz 11-mm

3.6.4 Imaging Modes

2D Imaging (256 gray shades)

CPD Imaging (64 colors)

PowerMap DCPD Imaging (64 colors)

3.6.5 Applications

Abdomen

Adult Cardiology

Gynecology

Obstetrics

Pediatric/Fetal Cardiology

Prostate

3.6.6 Display Elements

Battery charge level

Date and Time

Depth scale

Exam type

Image memory

Measurements

Optimize setting

Patient identification (ID)

Patient name

Pictographs

Transducer type

Text

Ultrasound image

Working (current system background task)

Zoom

3.6.7 Ultrasound System Controls

Cine

Depth

Freeze

Function keys

Gain (near, far, overall)

Keys

Measure

Menus (context-specific)

Optimize

Patient

Print

Save

Select

Text/Pictographs

Zoom (2X)

3.6.8 Measurements

Distance

Area and circumference

3.6.9 Cardiac Calculations

IVS Thickening Fraction, percent

Fractional LVD Shortening, percent

LVPW Thickening Fraction, percent

Ejection Fraction (EF), percent

Cardiac Output (CO) in liters per minute

Heart Rate (HR) in beats per minute

Stroke Volume Index (SV) milliliters

Left Ventricle End Volumes (Teicholz)

Aorta/Left Atrium (Ao/LA)

3.6.10 Obstetrical Calculations

Average ultrasound age (AUA)

Estimated date of delivery (EDD) by Last Menstrual Period (LMP)

Estimated date of delivery by AUA

Estimated fetal age

Estimated fetal weight (EFW)

3.6.11 Fetal Tables

Abdominal Circumference (AC)

Biparietal Diameter (BPD)

Crown Rump Length (CRL)

Estimated Fetal Weight (EFW)

Femur Length (FL)

Gestational Sac (GS)

Head Circumference (HC)

Transverse Trunk Diameter (TTD)

Occipital Frontal Diameter (OFD)

3.6.12 Image Storage

50 images

Cine review

3.6.13 Peripherals

See the manufacturer's specifications for the following peripherals.

Medical Grade

- VCR
- Video printer (black-and-white or color)
- Video monitor (external)

Non-medical Grade (Commercial)

- Digital video recording/playback product
- External monitor (e.g., handheld or personal display)

3.6.14 Accessories

Transducer covers (PROcovers Endocavity Latex Non-Sterile Ultrasound Transducer Cover Kit, CIVCO Medical Instruments are recommended)

Note: To re-order transducer covers and acoustic gel, e-mail CIVCO Medical Instruments at www.civcomedical.com or call 1-800-445-6741 in the U.S. or contact your local representative.

AIUM Ultrasound Medical Safety Guidance document

Battery

Power cord

Power supply

Printer control cable

SiteCharge dual battery charger (optional)

SitePack protective carrying case (optional)

SiteStand mobile docking station (optional)

User Guide

Video cable

3.6.15 Temperature and Humidity Limits

3.6.15.1 System Operating

- 10–40°C (50–104°F), 15–95% R.H.
- 700-1060hPa (0.7 ATM to 1.05 ATM)

3.6.15.2 System Shipping/Storage

- -35–65°C (-31–149°F), 15–95% R.H.
- 500-1060hPa (0.5ATM to 1.05 ATM)

3.6.15.3 Battery Operating

- 10–40°C (50–104°F), 15–95% R.H.

3.6.15.4 Battery Shipping/Storage

- -20–60°C (-4–140°F), 0–95% R.H.

3.6.15.5 Transducers Operating

- 10–40°C (50–104°F), 15–95% R.H.

3.6.15.6 Transducers Shipping/Storage

- -35–65°C (-31–149°F), 15–95% R.H

3.6.16 Electrical

- System optional: 100-120/220-240 Vac, 50/60 Hz input, 16.0 Vdc output power supply
- SiteCharge dual battery charger input voltage: 16.0 Vdc, 2.8 A
- SiteCharge dual battery charger output voltage: 12.6 Vdc, 3.0 A (2x)
- AC power supply input: 100-120/220-240 Vac, 50/60 Hz, 1.0-0.50 A
- AC power supply output: + 16.0 Vdc, 2.8 A
- SiteStand mobile docking station input: 100-120/220-240 Vac, 50/60 Hz, 1.0-0.50 A
- SiteStand mobile docking station outputs: + 16.0 Vdc, 2.8 A. and 100-120/220-240 Vac, 50/60 Hz, 1.0-0.50 A (2x)

3.7 Battery

- 6-cell, 11.1 Vdc, 3.0 amp-hours, rechargeable, lithium-ion battery pack
- Run time: 1.5 to 4 hours, depending upon operating conditions

3.8 Meets Electromechanical Safety Standards

EN 60601-1:1997, European Norm, Medical Electrical Equipment-Part 1. General Requirements for Safety.

EN 60601-1-2:1998, European Norm, Medical Electrical Equipment. General Requirements for Safety-Collateral Standard. Electromagnetic Compatibility. Requirements and Tests.

C22.2, No. 601.1:1998, Canadian Standards Association, Medical Electrical Equipment-Part 1. General Requirements for Safety.

CEI/IEC 61157:1992, International Electrotechnical Commission, Requirements for the Declaration of the Acoustic Output of Medical Diagnostic Ultrasonic Equipment

UL 2601-1:1999, Underwriters Laboratories, Medical Electrical Equipment-Part 1: General Requirements for Safety.

3.9 Meets EMC/EMI Standards

IEC 61000-4-2:1999, International Electrotechnical Committee, Electromagnetic Compatibility (EMC)-Part 4. Testing and Measurement Techniques-Section 4.2: Electrostatic Discharge/Immunity Test-Basic EMC Publication

IEC 61000-4-3:1997, International Electrotechnical Committee, Electromagnetic Compatibility (EMC)-Part 4. Testing and Measurement Techniques-Section 3: Radiated Radio-Frequency, Electromagnetic Field Immunity Test.

IEC 61000-4-4:1995, International Electrotechnical Committee, Electromagnetic Compatibility (EMC)-Part 4. Testing and Measurement Techniques-Section 4, Electrical Fast Transient/Burst Immunity Test-Basic EMC Publication.

IEC 61000-4-5:1999, International Electrotechnical Committee, Electromagnetic Compatibility (EMC)-Part 4. Testing and Measurement Techniques-Section 5, Surge Immunity Test.

CISPR11:97, International Electrotechnical Commission, International Special Committee on Radio Interference. Industrial, Scientific, and Medical (ISM) Radio-Frequency Equipment Electromagnetic Disturbance Characteristics-Limits and Methods of Measurement.

3.10 Meets Airborne Equipment Standards

RTCA/DO160D:1997, Radio Technical Commission for Aeronautics, Environmental Conditions and Test Procedures for Airborne Equipment, Section 21.0 Emission of Radio Frequency Energy, Category B.

CHAPTER 4

Setup and Operation

WARNING: CRITICAL TEST FUNCTION - A failure of the system functional tests performed in this procedure could adversely affect safety or effectiveness of the system.

4.1 Connecting and Removing Transducers

The system is supplied with one or more transducers. Only one transducer can be connected to the system at a time.

WARNING: The transducer connector can become hot during operation. This is normal. Operate the system in the SiteStand mobile docking station or on a flat, hard surface to allow air flow past the connector.

CAUTION: The electrical contacts inside the system transducer receptacle may be damaged by foreign material or by rough handling. Do not touch the electrical contacts. Keep foreign material out of the receptacle. Keep a transducer connected to the system whenever possible.

To connect the transducer:

1. On the transducer connector, pull the lever up and rotate it clockwise until it snaps to a stop (Figure 4.1). The lever should be easy to move. Do not force the lever.
2. Align the transducer connector with the transducer receptacle on the rear of the system and insert it by pushing the transducer connector into the transducer receptacle. The transducer connector should be easy to insert. Do not force the transducer connector.
3. Turn the lever counterclockwise until it snaps to a stop.

4. Press the lever down until it snaps into place, securing the transducer connector to the system.

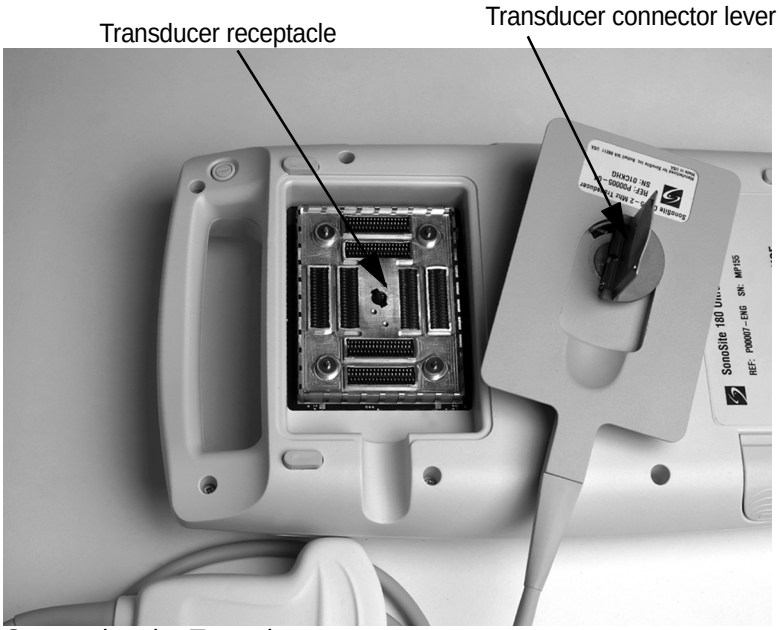


Figure 4.1 Connecting the Transducer

To remove the transducer:

1. On the transducer connector, pull the lever up and rotate it clockwise until it snaps to a stop (Figure 4.1).
2. Carefully pull the transducer connector away from the system.

4.2 Removing and Installing the Battery

If the battery is being installed for the first time, it will need to be charged.

To remove the battery:

1. Press and hold the **power** switch for one second to turn off the system.
2. Locate the battery compartment at the bottom of the system.
3. If you are holding the system, place your hand beneath the battery to ensure that it does not fall out upon release.
4. Press the battery release button to release the battery.

To install the battery:

Install a new battery into the battery compartment by pushing it into the compartment until it clicks into place. (Do not force the battery into the compartment, check the battery orientation if the battery is difficult to install.)

4.3 Turning the System On and Off

When turning power on or off, you must press and hold the power switch for approximately one second before the system responds. This feature prevents battery discharge, resulting from accidentally turning the system on. It also prevents accidentally turning the system off during an exam.

The first time you turn on the system, set the date and time. See ***Chapter 4.8,*** *Using System Setups*.

CAUTION: Do not use the system if an error message appears on the image display. Note the error code. Call SonoSite technical support or contact your local representative. When an error code occurs, turn off the system by pressing and holding the power switch until the system powers down.

To turn on power:

1. Locate the **power** switch on the back of the left side of the system handle. See Figure 3.2, *SonoSite Ultrasound System Controls,* on page 16.
2. Press and hold the **power** switch until the system beeps or until you see the image display.
3. Release the **power** switch.

To turn off power:

1. Press and hold the **power** switch.

   You will hear the system emit two sets of “high-low” beeps. The system powers off after the second set of beeps.
2. Release the **power** switch.

To wake up the system:

- The system has a sleep delay, which is invoked based on the **sleep delay** system setup. When the battery charge indicators are blinking, but the other system lighting is off, press any system control to wake up the system.

4.4 Using AC Power

The battery charges while using the system on AC power. If the system is off and connected to AC power, a fully discharged battery will charge in about 3 hours.

To use AC power:

1. Connect the line cord to the AC power supply.
2. Connect the line cord to a hospital-grade, electrical outlet.
3. Connect the AC power supply to the system AC line voltage receptacle on the upper left side of the system (Figure 4.2).

Note: You must wait approximately 10 seconds after connecting to AC power before you can turn on the power switch.

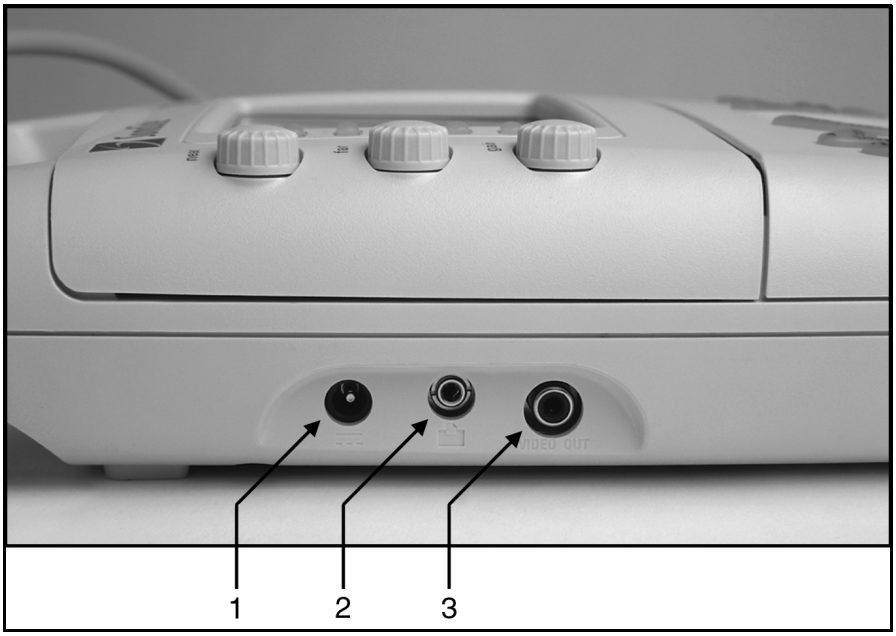


Figure 4.2 System Connections

Table 4.1 lists the SonoSite system connections.

Table 4.1 System Connections

NUMBER	FEATURE
1	AC line voltage receptacle.
2	Remote control receptacle for an approved printer.
3	Video receptacle for an approved VCR, printer, or external video monitor.

4.5 Upgrading the System Software

Transducers that you receive from SonoSite may contain either required or optional upgrades to the system software that resides on your SonoSite system.

Whenever you connect a transducer to a SonoSite system, the system communicates with a transducer to determine if the transducer contains software that would upgrade the system.

***CAUTION*:** Initiating any upgrade of the system software erases any images stored on your system. Do not upgrade the system software until you have determined that any stored images are no longer needed.

To upgrade the system software:

1. When you first connect a transducer with new software and turn the system on, the following message displays:
   Do you want to upgrade the system software?

For required upgrades:

You must either perform the software upgrade or replace the transducer with one that is compatible with the software currently installed on your system. Do one of the following:

- Select **no** (disconnect transducer) to reject the system software upgrade.
- Select **yes** (up to 20 minutes) to accept the system software upgrade and go to step 2.

For optional upgrades:

You may either install the new software or continue to use the existing software. SonoSite recommends that you install these optional upgrades soon after receiving them. Do one of the following:

- Select **no** (continue) to use the system without upgrading.
- Select **yes** (up to 20 minutes) to accept the upgrade and go to step 2.

2. When you have accepted the upgrade, the system loads the new software and displays the following message:
Upgrade in progress (20 minutes total).
Note: The system upgrade can take up to 20 minutes; however, many software upgrades will complete successfully in less time.

To cancel the upgrade in progress, select **cancel.**

If this is a required upgrade:

- The existing software remains installed.
- The system displays the following message:
Upgrade or replace your transducer.

If this is an optional upgrade:

- The existing software remains installed.
- The system will go to live scan.

3. When the system has loaded the new software, the following message displays:
Successful upgrade.

If the software upgrade is unsuccessful, the system will display an error code and you should call SonoSite technical support. For U.S. customers, call 1-888-482-9449, extension 2513. For international customers, call 1-425-951-1330 or contact your local representative.

4. Select **reboot** to restart your system.

During the restart, the initial system screen will show two progress indicator bars. These progress indicator bars are present while the system is replacing its operating software and will disappear when the process is completed.

When the operating software has been replaced, the system will present you with the license update screen so that you may license the software. At this point, the software upgrade process is completed, but the system software is not yet licensed. The following section explains how to license your software.

4.5.1 Installing A License Key

When you have obtained a license key for your software, you must enter it into the system. Once a valid license key has been entered, the system remains licensed until the next time the system software is upgraded.

The system provides a license update screen, which is displayed whenever the system is started and the software is not yet licensed. The license update screen displays: the License Update number, the Arm Ver: (version), the PCBA Serial No: (number), the SonoSite website address and telephone number (U.S. customers only), the License number (12-digits), the Register later or done softkey buttons, and the time remaining.

When the license update screen displays, enter your license key in the License number field.

- If the license key that you entered is recognized by the system as being valid for your system and the software you installed, a done softkey button displays. Select **done** to install the license key and license your software.
- If the license key that you entered is not recognized by the system, the register later softkey button remains on the screen as long as the defined grace period has not expired.
- If the grace period has expired, the menu item will indicate this by showing zero hours remaining in the grace period. At this point, you must then enter a valid license key before you can use the system with this or any other transducer.

Note: If you have entered a valid license key and you cannot complete the licensing procedure, verify that the license key has been entered correctly. The license key should be exactly 12-digits (decimal), with no other characters or punctuation.

If after confirming correct entry of the license key, you are still unable to license your system; call SonoSite technical support. U.S. customers call 1-888-482-9449, extension 2513. International customers call 1-425-951-1330 or contact your local representative.

If the system is on and the grace period expires, the license update screen must be displayed from the system information screen.

4.5.2 Displaying the System Information Screen

To display the system information screen:

1. Press and release **function**.
2. Press and release **i**. The system information screen displays (Figure 4.3).

   The system information screen displays the following information: the Boot/PIC Vers: (version), the Arm Ver: (version), the PCBA Serial No: (number), the Product Name:, the Status, the CPLD 1, 2, SH Ver: (version), SHDB Ver: (version), Sh Serial No. (number).

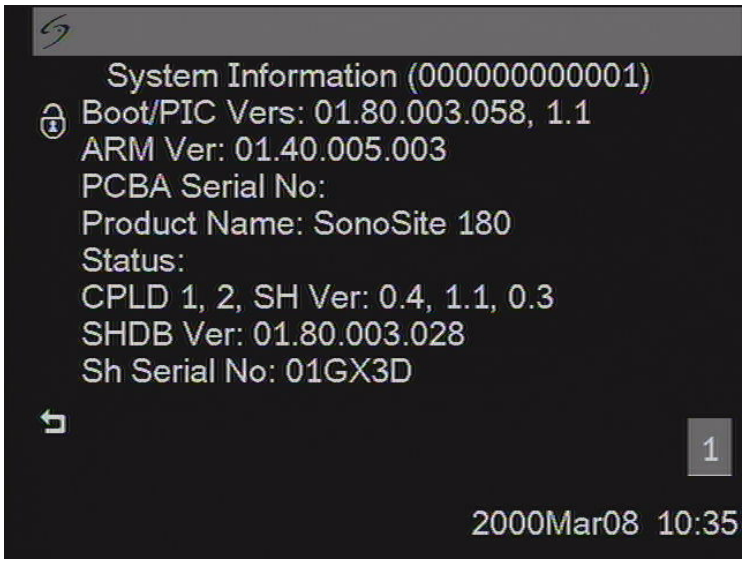


Figure 4.3 System Information Screen

4.5.3 Displaying the License Information Screen

To display the license information screen:

1. Select the **padlock icon**.The license update screen displays (Figure 4.4).

   The license update screen displays the following information: the License Update number, ARM Ver: (version), PCBA Serial No. (number), the SonoSite web site address and telephone number, the license number:, and the done button.

2. Perform the steps in *Section 4.5.1*.

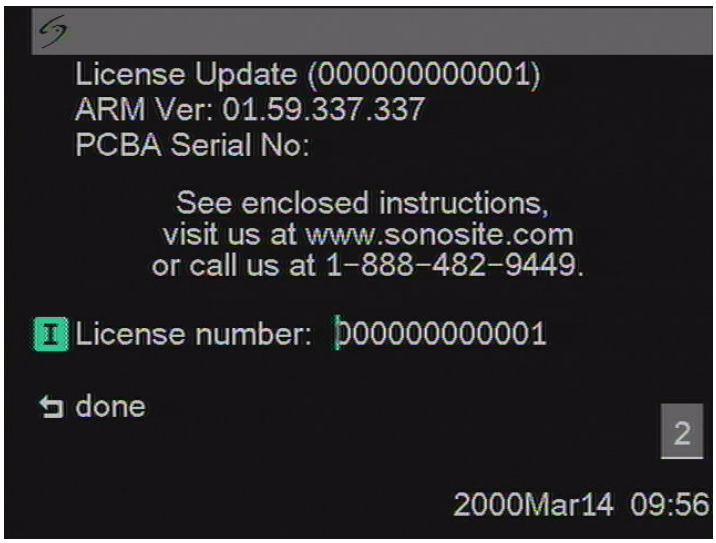


Figure 4.4 License Update Screen

4.6 Checking and Charging the Battery

To check the battery:

Five light-emitting diodes (LEDs) on the right side of the system monitor allow you to check the battery condition. If all LEDs are lit, the battery is fully charged. A solid dark gray battery icon in the lower right portion of the system display indicates a low battery. A solid white battery icon indicates approximately 10 minutes of battery life remaining. A flashing white battery icon indicates approximately 5 minutes of battery life remaining.

The system will operate on a fully-charged battery for 1.5 to 4 hours, depending upon use. Ensure the battery is charged at all times to provide the longest possible battery operation. You can set the **sleep** and **power** setups to prolong battery life.

When the system is not likely to be used for some time, to prevent total battery discharge, remove the battery from the system.

To charge the battery:

CAUTION: Charge batteries only when the ambient temperature is between 0° and 40°C (32° and 104°F).

1. Connect the line cord of the power supply to a hospital-grade electrical outlet.
2. Connect the AC power supply to the system using the upper, left receptacle on the left side of the system.
3. The LEDs on the right side of the monitor indicate the level of battery charge (all LEDs lit indicate a fully-charged battery; it takes about 3 hours to charge a battery, when the system is off).

Table 4.2 System Connections

Number	Feature
1	DC line voltage receptacle.
2	Remote control receptacle for an approved printer.
3	Video receptacle for an approved VCR, printer, or external video monitor.

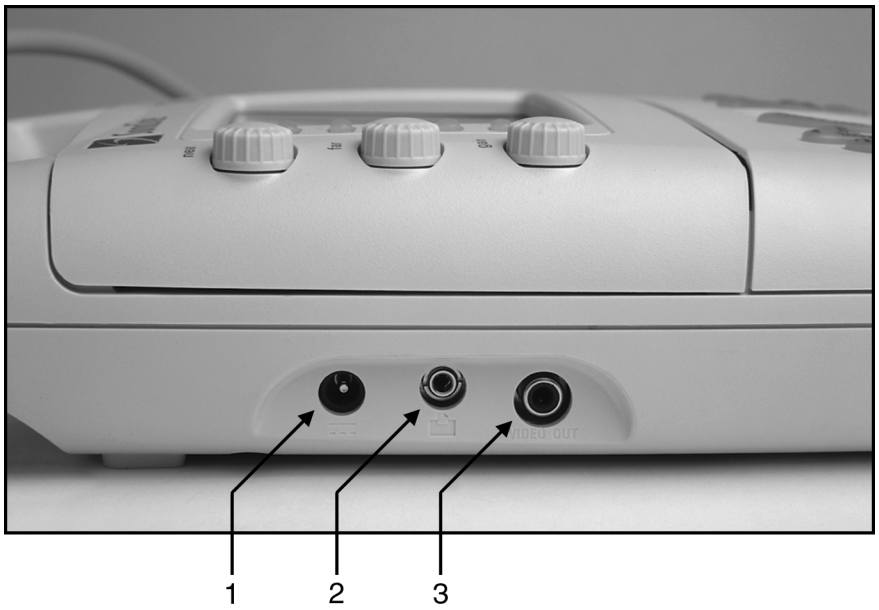


Figure 4.5 System Connections

4.7 Using the SiteCharge Dual Battery Charger

To use the SiteCharge dual battery charger:

1. Connect the power supply to the SiteCharge dual battery charger.
2. Connect the AC line cord to a power receptacle. When the blue SonoSite logo on the front of the SiteCharge dual battery charger lights, its indicates the power is on.
3. Insert one or two batteries into the SiteCharge dual battery charger (the batteries only fit one way).

- When the yellow light on the SiteCharge dual battery charger beside a battery is lit, the battery is charging. It may take up to 60 seconds for the yellow light to come on depending on the discharge state of the battery.
- When the yellow light is flashing, the battery is not properly installed, the battery or the SiteCharge dual battery charger is defective, or the ambient temperature is below 0°C (32°F) or greater than 40°C (104°F). Check the battery installation; if the battery is properly installed and the yellow light flashes, call SonoSite or your local representative.

Note: When the battery reaches full charge, both the yellow and green LEDs may be lit or flashing.

- When the green light beside a battery is lit, the battery is fully charged and is ready for use. (The SiteCharge dual battery charger can charge one or two batteries in less than 4.5 hours, depending on the discharge state of the battery.)

4. When the green light beside a battery is lit during an over-temperature condition, it indicates that the charging has been suspended.

4.8 Using System Setups

System setups are used to customize the system. They are available by pressing **patient** and selecting **system setup**. The system setups include image orientation, the caliper line that connects the measurement calipers, thermal index selection, and turning on the pictographs. Screen information setups allow you to show or hide the optimize icon, the time, the memory icon, and the patient name. You can also set the audible beep, battery sleep and power delays, and the date and time. Additionally, system setups include the video format, printer, calcs authors, and function key assignments. You can resume imaging from any system setup function by pressing **patient**.

Perform the following procedures to become familiar with using the system setups, then use these basic operations to set the range of setups required for your uses.

4.8.1 Setting the Date and Time

To set the date and time:

WARNING: An accurate date and time are critical for accurate obstetrics calculations. Verify that the date and time are accurate before each use of the system. The system does not automatically adjust for daylight savings time changes.

1. Press **patient**. A menu appears on which **system setup** is listed.
2. Select **system setup**. A menu appears on which is listed **audio, battery, date/time**.
3. Select **audio, battery, date/time.**
4. Select **date/time**. A cursor appears at the left side of the date/time display.
5. Type in the current date (year, month, day) and time in the 24-hour format (hours, minutes). If you make a mistake, you can use the **arrow** keys between the **delete** and **enter** keys to move the cursor.
6. Press **patient** to resume imaging.

4.8.2 Setting Up A Recommended Printer

To set up a recommended printer:

To use the system print controls, **print** and **print all images**, the remote control must be connected.

CAUTION: Use only peripherals recommended by SonoSite with the system. The system can be damaged by connecting a peripheral not recommended by SonoSite.

1. Connect a recommended printer to the system using the recommended printer control cable. The receptacles are on the left side of the system. There are two connections required: **VIDEO OUT** (right receptacle, 3 in Figure 4.5) and **remote** icon (middle receptacle, 2 in Figure 4.5).
2. Turn on the printer. (Refer to the printer manufacturer’s instructions for specific printer information.)

3. Press **patient**. A menu appears on which is listed **system setup**.
4. Select **system setup**. A menu appears on which is listed **video, printer, calcs, f keys**.
5. Select **video, printer, calcs, f keys**.
6. Select **printer** to select the type of printer connected to the system. (Only the types of printers appearing as settings are recommended for use with the system.) The printer is ready to print.
7. Press **patient** to resume imaging.

4.8.3 Setting Up A Recommended VCR

To set up a recommended VCR:

1. Connect a recommended VCR to the system using the recommended video cable. The receptacle is on the left side of the system. There is one connection required: **VIDEO OUT** (right receptacle, 3 in Figure 4.5).
2. Turn on the VCR. (Refer to the VCR manufacturer's instructions for specific VCR information.)
3. Press **patient**. A menu appears on which is listed **system setup**.
4. Select **system setup**. A menu appears on which is listed **video, printer, calcs, f keys**.
5. Select **video, printer, calcs, f keys**.
6. Select the appropriate video format: **NTSC** or **PAL**.
7. Press **patient** to resume imaging.
8. Use the controls on the VCR to record the image display. A separate video monitor, connected to the VCR, is required for playing the recording.

4.8.4 Setting Up A Recommended Video Monitor (External)

To set up a recommended video monitor (external):

1. Connect a recommended video monitor to the system using the recommended video cable. The receptacle is on the left side of the system. There is one connection required: **VIDEO OUT** (right receptacle, 3 in Figure 4.5).
2. Turn on the video monitor. (Refer to the video monitor manufacturer's instructions for specific information.)

4.8.5 Setting Up Function Key Assignments

To set up function key assignments:

Function keys 1 through 6 can be assigned text for quick and easy labeling of images.

1. Press **patient**. A menu appears on which is listed **system setup**.
2. Select **system setup**. A menu appears on which is listed **video, printer, calcs, f keys**.
3. Select **video, printer, calcs, f keys**.
4. Select **function key assignment**. A menu appears which lists function keys, **f1** through **f6**.
5. The data entry cursor appears next to **f1**.
6. Type in your text. Use the **arrow** and **space** keys to correct mistakes.
7. Press **enter** to move to the next field. Continue to assign text to the remaining function keys, as desired.
8. Select a new exam type to assign function key text and repeat the steps above, or select **done** when finished. Refer to the *SonoHeart Ultrasound System User Guide* for how to use the assigned function keys.

4.8.6 Changing All System Setups to the Default Settings

To change all system setups to the default settings:

1. Turn the system off.
2. Connect the system to AC power, see *Section 4.4*.
3. Simultaneously press and release 1 and the power switch. The system beeps several times and then the image display appears with all default settings.

WARNING: An accurate date and time are critical for accurate obstetrics calculations. Verify that the date and time are accurate before each use of the system.

4. Reset the system settings, see *Section 4.8*.

4.9 Using the SiteStand Mobile Docking Station

4.9.1 Connecting to AC Power

To connect AC power to the docking station:

When AC power is connected to a system installed in the docking station, the system battery charges. The system operates on battery power if the AC power is not connected to the docking station.

CAUTION: Charge the batteries only when the ambient temperature is between 0° and 40°C (32° and 104°F).

1. Connect the AC line cord to the AC power receptacle at the bottom of the docking station (Figure 4.6).
2. Connect the AC line cord to a hospital-grade electrical outlet.

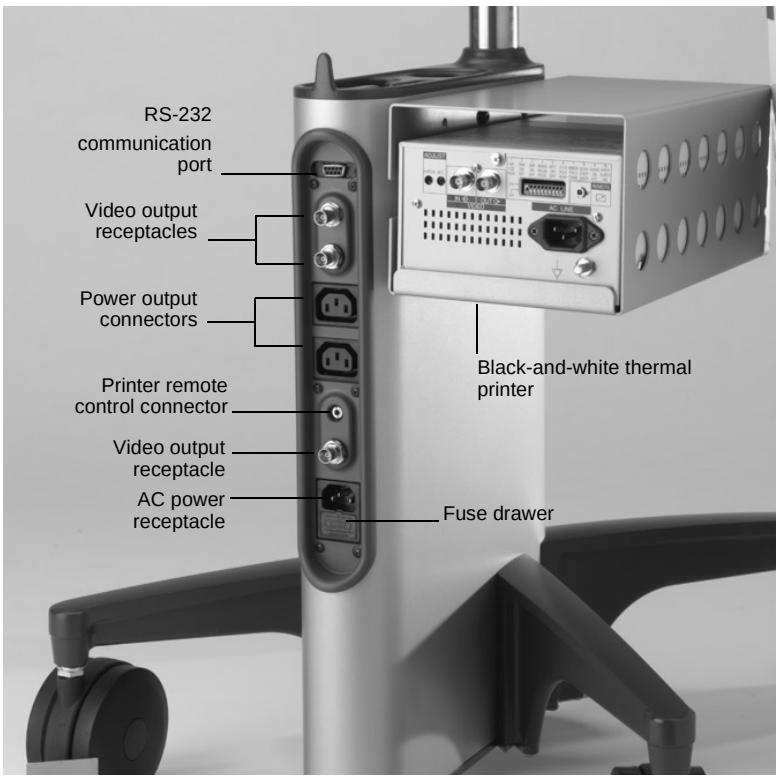


Figure 4.6 SiteStand Mobile Docking Station Connections

4.9.2 Inserting the System

To insert the system into the docking station:

1. Press on the release lever to open the docking station.
2. Insert the system into the sleeve of the docking station. Ensure the two alignment posts fit into the corresponding holes in the bottom of the system.
3. Latch the docking station by using both hands to press on both sides of the sleeve; press until an audible click is heard.

4.9.3 Removing the System

To remove the system from the docking station:

1. Grasp the system by the handle.
2. Press on the release lever to open the docking station.
3. Carefully remove the system by pulling it up and back.

4.9.4 Adjusting the Height

To adjust the height of the docking station:

1. While holding onto both sides of the sleeve, press down on the foot pedal and push down on the docking station to lower it.
2. Press down on the foot pedal to raise the docking station. The height adjustment is gas assisted; some manual assistance may be needed, such as pulling up on the sleeve.

4.9.5 Adjusting the Angle

To adjust the angle of the docking station:

1. Grasp the docking station handle.
2. Pull out the knob located under the right side of the sleeve.
3. Adjust the docking station to the desired angle (three positions are available); adjust until an audible click is heard.

4.9.6 Locking and Releasing the Wheels

To lock and release the docking station wheels:

1. Lock the wheels by pushing down the locking levers on the front wheels.
2. Release the wheels by pulling up the locking levers up on the front wheels.

4.9.7 Connecting A Recommended Printer

To connect a recommended printer to the docking station:

The remote control and video output receptacles on the bottom of the docking station are identical to the ones on the system. Printer accessory cables are provided with each stand.

4.9.8 Connecting Recommended Peripherals

To connect other recommended peripherals to the docking station:

The docking station provides two additional video output receptacles for recommended peripherals. These receptacles are located at the top of the docking station connector panel. Use the recommended video cable.

4.9.9 Replacing the Fuse

To replace the electrical fuse:

1. Disconnect the AC line cord from the hospital-grade electrical outlet.
2. Disconnect the AC line cord from the bottom of the SiteStand mobile docking station.
3. Use a small, slotted screwdriver to remove the fuse drawer (located directly below the input AC receptacle on the SiteStand mobile docking station).
4. Carefully replace the blown fuse with a 250 volt, 6.3 amp, 5.0 x 20 mm Slo-Blo®-type fuse.
5. Install the fuse drawer.
6. Connect the AC power to the SiteStand mobile docking station.

CHAPTER 5

Cleaning and Disinfecting

5.1 Universal Precautions

SonoSite recommends that personnel who routinely have exposure to returned medical devices practice “universal precautions.” Universal precautions are an approach to infectious control. It is recommended that those servicing this product follow the prescribed standards for their area.

5.2 Receipt of Suspected Contaminated Materials

- When opening a product returned for service, if visual inspection suggests possible contamination, take proper steps to contain the contamination. Necessary Personal Protective Equipment (PPE) (gloves, masks, and gowns) are worn when opening or examining a package suspected of contamination.
- Prior to transfer to a service area, the suspect package must be labeled as “contaminated” and sealed to prevent exposure.
- Any packing materials removed from a package suspected of contamination must be disposed of in a biohazard container.
- Any contaminated materials received with the product must also be disposed of in an appropriate biohazard container. Contaminated materials may include biohazardous waste and sharps.
- A disinfecting agent should be maintained for use in the event of possible contamination of any work surface. The recommended agent for disinfecting work surfaces is 0.5% sodium hypochlorite (bleach) solution. Prepare the agent by mixing one part household bleach (5.25% - 6% sodium hypochlorite) to nine parts water. The solution may be sprayed or wiped onto the work surface and allowed to air dry.

Use these recommendations when cleaning or disinfecting your ultrasound system, transducers, and accessories. This chapter is intended to assist in effective cleaning and disinfection. It is also intended to protect the system and transducers against damage during cleaning or disinfection.

For more information about cleaning or disinfection solutions or ultrasound gels used with the transducer, call SonoSite technical support or your local representative. For information about a specific product, call the product manufacturer.

5.3 Recommended Disinfectants

For a list of disinfectants recommended for use on the SonoSite ultrasound system and transducers, see Table 5.1 on page 50.

5.4 Safety

Please observe the following warnings and cautions when using cleaners, disinfectants, and gels. More specific warnings and cautions are included in the various specific product literature and in the procedures later in this chapter.

WARNINGS:

The level of disinfection required for a device is dictated by the type of tissue it will contact during use. Ensure the disinfectant type is appropriate for the type of transducer and application. For information, see the disinfectant label instructions and the recommendations of the Association for Professionals in Infection Control and Epidemiology (APIC) and FDA.

Most transducers cannot be sterilized. When sterility is required, use a sterile transducer cover.

The use of sterile transducer covers and sterile coupling gel is recommended for clinical applications of all intracavitary transducers. Do not apply the transducer cover and gel until you are ready to perform the procedure.

CAUTIONS:

Do not allow disinfectant to contact metal surfaces. Use a soft cloth lightly dampened in a mild soap or compatible cleaning solution to remove any disinfectant that remains on metal surfaces.

Repeated, long-term exposure to coupling gel can damage transducers.

Transducer covers can contain natural rubber latex, which may cause allergic reactions in some individuals. Refer to the FDA Medical Alert-Allergenic Reactions to Latex-Containing Medical Devices, dated March 29, 1991.

5.5 Cleaning and Disinfecting the Ultrasound System

The exterior surface of the ultrasound system and the accessories can be cleaned and disinfected using a recommended cleaner or disinfectant.

To clean the LCD video monitor, dampen a soft, cotton cloth with an ammonia-based, window cleaner, and wipe the LCD video monitor clean.

WARNINGS:

To avoid electrical shock, before cleaning, disconnect the system from the power supply.

Always use protective eyewear and gloves when cleaning and disinfecting systems.

If a pre-mixed disinfection solution is used, observe the solution expiration date, and ensure that the date has not passed.

The level of disinfection required for a product is dictated by the type of tissue it contacts during use. Ensure the solution strength and duration of contact are appropriate for the clinical application of the transducer. For information, see the disinfectant label instructions and the recommendations of the Association for Practitioners in Infection Control and Epidemiology (APIC) and FDA.

CAUTIONS:

Do not spray cleaners or disinfectant directly on the system surfaces. Doing so may cause solution to leak into the system, damaging the system and voiding the warranty.

Do not use strong solvents such as thinner or benzene, or abrasive cleansers, since these will damage the exterior surfaces.

Use only recommended cleaners or disinfectants on system surfaces. Immersion-type disinfectants are not tested for use on system surfaces.

When you clean the system, ensure the solution does not get inside the system keys, the display connections, the transducer receptacle, or the battery compartment.

Do not scratch the LCD video monitor.

To clean and disinfect the system surfaces:

1. Turn off the system.
2. Disconnect the system from the power adapter.
3. Use a soft cloth lightly dampened in a mild soap or detergent cleaning solution to clean exterior surfaces of the system.
4. Mix the disinfection solution compatible with your system according to the label instructions for the solution strength.
5. Wipe system surfaces with the disinfection solution, following disinfectant label instructions for solution strengths and disinfectant contact duration. Ensure the solution strength and duration of contact are appropriate for the intended clinical application.

6. Air dry or towel dry the system with a clean cloth according to the instructions on the disinfectant label.

5.6 Cleaning and Disinfecting Transducers

To disinfect your transducers, you can use an immersion method or a wipe method. Immersible transducers can be disinfected only if the product labeling of the compatible disinfectant you are using indicates it can be used with an immersion method.

WARNINGS:

To avoid electrical shock, before cleaning, disconnect the transducer from the system.

Always use protective eyewear and gloves when cleaning and disinfecting transducers.

If a pre-mixed solution is used, observe the solution expiration date, and ensure that the date has not passed.

The level of disinfection required for a transducer is dictated by the type of tissue it contacts during use. Ensure the solution strength and duration of contact are appropriate for the clinical application of the transducer. For information, see the disinfectant label instructions and the recommendations of the Association for Practitioners in Infection Control and Epidemiology (APIC) and FDA.

CAUTIONS:

Transducers must be cleaned after every use. Cleaning transducers is necessary prior to effective disinfection. Ensure you follow the manufacturer's instructions when using disinfectants.

Do not use a surgeon's brush when cleaning transducers. Even the use of soft brushes can damage a transducer. Use a soft cloth.

Using a non-recommended cleaning or disinfection solution, incorrect solution strength, or immersing a transducer deeper or for a longer period of time than recommended can damage or discolor the transducer and void the transducer warranty.

Do not immerse transducers longer than one hour. Transducers can be damaged by longer immersion times.

Do not allow cleaning solution or disinfectant into the transducer receptacle.

To clean and disinfect a transducer:

1. Disconnect the transducer from the system.
2. Remove any transducer cover.
3. Use a soft cloth lightly dampened in a mild soap or compatible cleaning solution to remove any particulate matter or body fluids that remain on the transducer or cable.

4. To remove any remaining particulates, rinse the transducer with water.
5. Wipe with a dry cloth; or wipe with a water-dampened cloth to remove soap residue, and then wipe with a dry cloth.
6. Mix the disinfection solution compatible with your transducer, according to the label instructions for solution strength.
7. Immerse the transducer into the disinfection solution.
8. Follow the instructions on the disinfectant label for the duration of the transducer immersion. Do not immerse transducers longer than one hour.
9. Using the instructions on the disinfectant label, rinse the transducer up to the point of immersion, and then air dry or towel dry with a clean cloth.
10. Examine the transducer for damage such as cracks, splitting, or fluid leaks. If damage is evident, discontinue use of the transducer, and contact SonoSite or your local representative.

5.7 Sterilizable Transducers

Currently, none of the system transducers are sterilizable.

5.8 Transducer Cables

All transducer cables can be disinfected using a recommended wipe, spray, or immersion disinfectant. Before disinfecting, however, you must orient the cable so the transducer and connector are facing up.

WARNING:

If a pre-mix solution is used, observe the solution expiration date, and ensure that the date has not passed.

CAUTION:

Attempting to disinfect a transducer cable using a method other than the one included here can damage the transducer and void the warranty.

To clean and disinfect the transducer cable:

1. Disconnect the transducer from the system.
2. Remove any transducer cover.
3. Orient the transducer and the connector so that they are both facing up.
4. Use a soft cloth lightly dampened in a mild soap and detergent solution to clean the transducer cable.
5. Mix the disinfection solution compatible with your transducer, according to the label instructions for solution strength.

6. Spray, wipe, or immerse the cable in the disinfection solution, following disinfectant label instructions for solution strength and duration of contact appropriate for the intended clinical use of the transducer.
7. Air dry or towel dry with a clean cloth according to the instructions on the disinfectant label.
8. Examine the transducer and cable for damage such as cracks, splitting, or fluid leaks. If damage is evident, discontinue use of the transducer, and contact SonoSite or your local representative.

Table 5.1 Disinfectants Compatibility with the SonoSite System and Transducers

Disinfection and Cleaning Solutions	Country of Origin	Type	Active Ingredient	C60	C15	ICT	System Surfaces
105 Spray	USA	Spray	Quat. Ammonia	T, C	U	N	U
AbcoCide (4)	USA	Liquid	Gluteraldehyde	T	U	T	N
AbcoCide 28 (4)	USA	Liquid	Gluteraldehyde	T	U	T	N
Alkacide	France	Liquid	Gluteraldehyde	T, C	U	T, C	N
Alkalingettes (3)	France	Liquid	Alkylamine, Isopropanol	T, C	U	N	N
Alkazyme	France	Liquid	Quat. Ammonia	T, C	U	N	N
Ampholysine Basique (3)	France	Liquid	Biguanide/Quat. Ammonia	T	U	N	N
Ampholysine plus	France	Liquid	Quat. Ammonia	T, C	U	N	N
Amphospray 41(3)	France	Spray	Ethanol	T, C	U	N	N
Amphyl (4)	USA	Liquid	O-phenylphenol	T	U	N	N
Asepti-Steryl 14 or 28 (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Aseptosol	Germany	Liquid	Gluteraldehyde	N	N	N	N
Autoclave (Steam)		System	Steam/Heat	N	N	N	N
Bacillocid rasant	Germany	Liquid	Glut./Quat. Ammonia	T, C	U	N	N
Bacillol 25	Germany	Liquid	Ethanol/Propanol	T, C	U	N	N
Bacillol Plus	Germany	Spray	Propanol/Glut.	N	N	N	N
Bactilysine	France	Liquid	Quat. Ammonia	T, C	U	N	N
Baktobod	Germany	Liquid	Glut. Quat. Ammonia	T, C	U	N	N
Banicide (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Biotensid	Germany	Spray	2-Propanol	N	N	N	A
Bleach (4)	USA	Liquid	NaCl Hypochlorite	T, C	U	N	N

Table 5.1 Disinfectants Compatibility with the SonoSite System and Transducers

Disinfection and Cleaning Solutions	Country of Origin	Type	Active Ingredient	C60	C15	ICT	System Surfaces
Bodedex	France	Liquid	Quat. Ammonia	T, C	U	N	N
Burnishine (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Cavicide (4)	USA	Liquid	Isopropyl	N	N	N	N
Cetavlon	France	Liquid	Cetrimide	T, C	U	N	N
Chlorispray	France	Spray	Gluteraldehyde	T, C	U	N	A
Cidalkan (3)	France	Liquid	Alkylamine, isopropanol	N	N	N	N
Cidex PA (3) (4)	USA	Liquid	Hydrogen Peroxide/Pera-cetic Acid	N	N	N	N
Cidex Plus (2) (4)	USA	Liquid	Gluteraldehyde	T, C	T, C	T, C	N
Cidex (2) (4)	USA	Liquid	Gluteraldehyde	T, C	T, C	T, C	N
Coldspor (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Coldspor Spray	USA	Spray	Gluteraldehyde	T, C	U	N	U
Control III (4)	USA	Liquid	Quat. Ammonia	T, C	U	N	N
Coverage Spray (4)	USA	Spray	Quat. Ammonia	T, C	U	N	U
Cutasept F	Germany	Spray	2-Propanol	T	U	N	A
Dismonzon pur	Germany	Liquid	Hexahydrate	N	N	N	N
Dispatch (4)	USA	Spray	NaCl Hypochlorite	T, C	T, C	N	N
End-Bac II	USA	Liquid	Quat. Ammonia	N	N	N	N
Endo FC	France	Liquid	Gluteraldehyde	T, C	U	T, C	N
Endosporine (3)	France	Liquid	Gluteraldehyde	T, C	U	T, C	N
Envirocide (4)	USA	Liquid	Isopropyl	T, C	U	N	N
Enzol	USA	Cleaner	Ethylene Glycol	T, C	T, C	T, C	U
Esculase 388	France	Liquid	Quat. Ammonia	T, C	U	N	N
Ethylene Oxide (EtO) (4)		System	Ethylene Oxide	N	N	N	N
Expose	USA	Liquid	Isopropyl	T, C	N	N	N
Foam Insurance	USA	Spray	n-Alkyl	T, C	U	N	N
Formac	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Gercid 90	France	Liquid	Quat. Ammonia	T, C	U	N	N
Gigasept AF (3)	Germany	Liquid	Quat. Ammonia	T, C	U	N	N

Table 5.1 Disinfectants Compatibility with the SonoSite System and Transducers

Disinfection and Cleaning Solutions	Country of Origin	Type	Active Ingredient	C60	C15	ICT	System Surfaces
Gigasept FF	Germany	Liquid	Bersteinsaure	T	U	N	N
Glutacide	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Helipur H+N (3)	Germany	Liquid	Gluteraldehyde/ Propanol	N	N	N	N
Hi Tor Plus	USA	Liquid	Chloride	T, C	T, C	N	N
Hibiclens	USA	Cleaner	Chlorhexidine	T, C	U	N	U
Incides	Germany	Wipe	Alcohol	N	N	N	U
Incidine	Germany	Spray	Aldehydes	T	U	N	A
Incidur Spray	Germany	Spray	Ethanol	N	N	N	N
Instruzyme	France	Liquid	Quat. Ammonia	T, C	U	N	N
Kleen-aseptic b (4)	USA	Spray	Isopropanol	T, C	U	N	U
Kohrsolin ff	Germany	Liquid	Gluteraldehyde	T, C	U	T, C	N
Korsolex (3)	Germany	Liquid	Gluteraldehyde	T, C	U	T, C	N
Korsolex basic (3)	Germany	Liquid	Gluteraldehyde	T, C	U	T, C	N
Korsolex Consentrate (3)	Germany	Liquid	Gluteraldehyde	N	N	N	N
Linget'anios	France	Towelette	Quat. Ammonia	T, C	U	N	N
LpHse (4)	USA	Liquid	O-phenylphenol	T, C	U	N	N
Lysertol V Neu (3)	Germany	Liquid	Gluteraldehyde, Formaldahyde, Quat. Ammonium chloride	T, C	U	N	N
Lysol IC (4)	USA	Liquid	O-phenylphenol	T, C	U	N	N
Madacide (4)	USA	Liquid	Isopropanol	T, C	U	N	N
Matar (4)	USA	Liquid	O-phenylphenol	T, C	U	N	N
Medside Medallion	USA	Liquid	Quat. Ammonia	T	U	N	N
MetriCide (2) (4)	USA	Liquid	Gluteraldehyde	T	T	T	N
MetriCide 28 (2) (4)	USA	Liquid	Gluteraldehyde	T, C	N	T, C	N
MetriCide Plus (4)	USA	Liquid	Gluteraldehyde	U	U	U	N
Metriguard (4)	USA	Liquid	Ammonium Chloride	T, C	U	N	N
MetriSpray (3) (4)	USA	Spray	Gluteraldehyde	T, C	U	N	U
MetriZyme	USA	Cleaner	Propylene Glycol	U	U	U	A

Table 5.1 Disinfectants Compatibility with the SonoSite System and Transducers

Disinfection and Cleaning Solutions	Country of Origin	Type	Active Ingredient	C60	C15	ICT	System Surfaces
Mikrobak forte	Germany	Liquid	Ammonium Chloride	T, C	U	N	N
Mikrozid Tissues (3)	Germany	Wipe	Ethanol/Propanol	N	N	N	A
Milton	Australia	Liquid	Sodium Hypochlorite	T, C	U	N	N
New Ger (3)	Spain	Liquid	n-Duopropenide	T, C	U	N	N
Nuclean	France	Spray	Alcohol/Biguanide	T, C	U	N	N
Omega (4)	USA	Liquid	Isopropyl	T, C	U	N	N
Omnicide 14NS (4)	USA	Liquid	Gluteraldehyde	T	U	T	N
Omnicide 28 (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Ovation (4)	USA	Liquid	O-phenylphenol	T, C	U	N	N
Peract 20 (1) (3)	USA	Liquid	Hydrogen Peroxide	N	N	N	N
Phagocide D (3)	France	Liquid	Gluteraldehyde	T, C	U	T, C	N
Phagolase ND NFLE (3)	France	Cleaner	Quaternary Ammonium, Alkylamine, Enzyme proteolytique	T, C	U	T, C	U
Phagolase pH Basique	France	Liquid	Gluteraldehyde	T, C	U	T, C	N
Phagolingette D 120 (3)	France	Towelette	Alcohol, Biguanide, Quaternary Ammonium	N	N	N	U
Phagosept Spray (3)	France	Spray	Alcohol, Biguanide, Quaternary Ammonium	N	N	N	U
PowerQuat	USA	Liquid	Quat. Ammonia	T, C	U	N	N
Precise (4)	USA	Spray	O-phenylphenol	T, C	U	N	U
Presept	USA	Liquid	NaCl Dichlorite	T, C	U	N	N
Presept	Canada	Liquid	Gluteraldehyde	T, C	U	T, C	N
Pro-Cide (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Pro-Cide 14NS (2) (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N

Table 5.1 Disinfectants Compatibility with the SonoSite System and Transducers

Disinfection and Cleaning Solutions	Country of Origin	Type	Active Ingredient	C60	C15	ICT	System Surfaces
Prontocid N (3)	Germany	Liquid	Formaldahyde/ Gluteraldehyde	N	N	N	N
Pyobactene	France	Liquid	Aldehydes	T, C	U	N	N
Pyosynthene EA 20	France	Liquid	Formaldahyde	T, C	U	N	N
Rivascop	France	Liquid	Quat. Ammonia	T, C	U	N	N
Ruthless	USA	Spray	Quat. Ammonia	N	N	N	U
Sagrosept	Germany	Liquid	Propanol	N	N	N	N
Salvanios pH 10	France	Liquid	Quat. Ammonia	T, C	U	N	N
Sani-Cloth (4)	USA	Wipe	Quat. Ammonia	T, C	U	N	U
SDS 14NS (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
SDS 28 (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Sekucid	France	Liquid	Gluteraldehyde	T, C	U	T, C	N
Sekucid N (3)	France	Liquid	Gluteraldehyde	T, C	U	T, C	N
Sekulyse	France	Liquid	Biguanide	T, C	U	N	N
Sekusept Extra	Germany	Liquid	Glyoxal/Glut.	T, C	T, C	N	N
Sekusept Extra N	Germany	Liquid	Gluteraldehyde	T, C	T, C	T, C	N
Sekusept forte	Germany	Liquid	Formaldahyde	T, C	T, C	N	N
Sekusept Plus	Germany	Liquid	Glucoprotamin	T, C	T, C	N	N
Sekusept Pulver	Germany	Liquid	Natriumperborat	T, C	U	N	N
Sklar (4)	USA	Liquid	Isopropanol	T, C	U	N	N
Softasept N	Germany	Spray	Ethanol	N	N	N	A
Sporadyne	France	Liquid	Didecyldimethyl	T, C	U	N	N
Sporicidin (2) (4)/ Wipes (4)	USA	Liquid/ Wipes	Phenol	T, C	T, C	N	U
Sporox II (4)	USA	Liquid	Hydrogen Peroxide	T, C	U	T, C	N
Staphene (4)	USA	Spray	Ethanol	T, C	U	N	U
STERIS (4)	USA	Liquid	Peracetic Acid	N	N	N	N
Surfaces Hautes (3)	France	Spray	Quat. Ammonia	T, C	U	N	A
TBQ (4)	USA	Liquid	Alkyl	T, C	U	N	N
Theracide	USA	Liquid	Quat. Ammonia	T, C	T, C	N	N

Table 5.1 Disinfectants Compatibility with the SonoSite System and Transducers

Disinfection and Cleaning Solutions	Country of Origin	Type	Active Ingredient	C60	C15	ICT	System Surfaces
Theracide	USA	Wipe	Quat. Ammonia	T, C	T, C	N	A
Thericide Plus	USA	Liquid	Quat. Ammonia	T, C	U	N	N
Tor (4)	USA	Liquid	Quat. Ammonia	T, C	U	N	N
Transeptic	USA	Cleaner	Alcohol	T	U	T	U
T-Spray	USA	Spray	Quat. Ammonia	T, C	U	N	U
T-Spray II	USA	Spray	Alkyl/Chloride	T	U	N	U
Ultra Swipes	USA	Wipe	Ethanol	T, C	U	N	U
Vaposeptol	Germany	Spray	Biguanide	T, C	U	N	N
Vesphene II (4)	USA	Liquid	Sodium/ o-Phenylphenate	N	N	N	N
Vespore (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Virex (4)	USA	Liquid	Quat. Ammonia	T, C	U	N	N
Wavicide -01 (2) (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Wavicide -06 (4)	USA	Liquid	Gluteraldehyde	T, C	U	T, C	N
Wex-Cide (4)	USA	Liquid	O-phenylphenol	T, C	T, C	N	N
Wipe Out (4)	USA	Liquid	Phenol/Glut.	T	U	N	N

(1) Compatible but no EPA Registration

(2) Has FDA 510 (k)

(3) Has CE Mark

4) EPA Registered

A = acceptable for use

N = No (do not use)

T = transducer only

T, C = transducer and cable

U = Untested (do not use)

CHAPTER 6

Troubleshooting

6.1 System and Subsystem Diagnosis

This section covers basic diagnostic and troubleshooting procedures you may need if the system is not operating properly. To diagnose system failures, consult Table and the referenced diagnostic figures that follow.

Table 6.1 Troubleshooting Subassemblies and Diagnostic Figures

SUBASSEMBLIES	DIAGNOSTIC FIGURES
Display	Figure 6.2
External Display	Figure 6.3
Keyboard	Figure 6.4
Trackball	Figure 6.5
System	Figure 6.6
Battery	Figure 6.7

6.2 Subassembly Replacement

The system is repairable through subassembly replacement.

6.3 Test Equipment

There is no test equipment required for this troubleshooting section. Test aids include an external monitor, a spare battery, and a SiteCharge dual battery charger.

6.4 Failures

6.4.1 Display

Display failures can be verified by attaching an external monitor to the external video connector. For example, if the system display is blank and the external video is functioning properly, the system display requires servicing.

6.4.2 Control Panel

Control panel failures can be identified and verified by going to the patient information screen and pressing each individual key on the keyboard. Function keys can be verified by noting their response when pressed.

6.4.3 Backlight LED

Backlight LED failures do not interfere with the operation of the system.

6.4.4 Trackball

Trackball failures are identified by either intermittent function or loss of control. The trackball can be cleaned by removing the retainer ring and then removing the ball.

6.4.5 Main PCBA

The main PCBA can present symptoms that may be difficult to assess. Main PCBA failures result in “assert codes” that are output to the display. You should note these assert codes and call SonoSite technical support for clarification of the failure. Figure 6.1 shows an assert code and a maintenance icon displayed on the system screen.

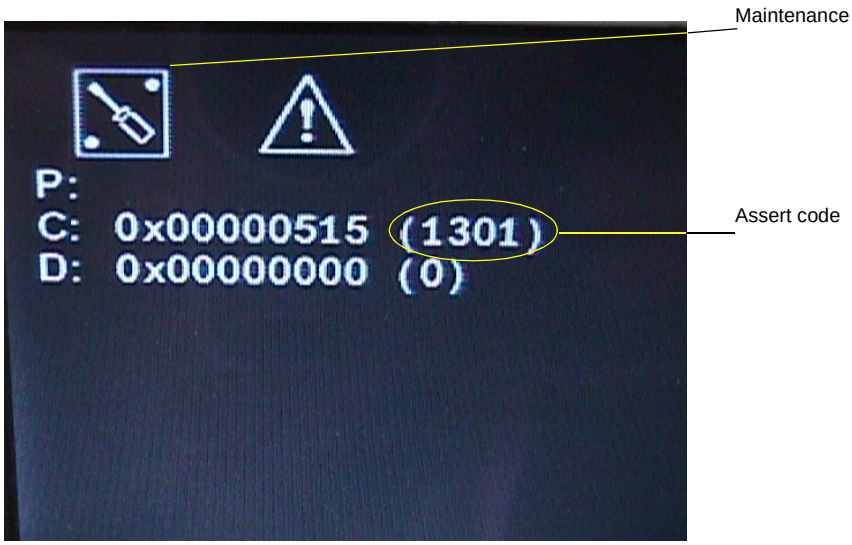


Figure 6.1 Assert Code and Maintenance Icon

6.4.6 Clearing the Main PCBA Failure

After the assert code has been recorded, power down the system.

1. Press the Power switch on the system until the power has been turned off (approximately 5–10 seconds).
2. Turn the power back on to check if the fault has been cleared or if the condition remains.

   If the condition has cleared, the system may be used. If the condition remains, corrective action must be taken before the system can be used.

6.4.7 Battery

Battery failures are identified when the system does not operate or does not run for the expected duration for a given charge.

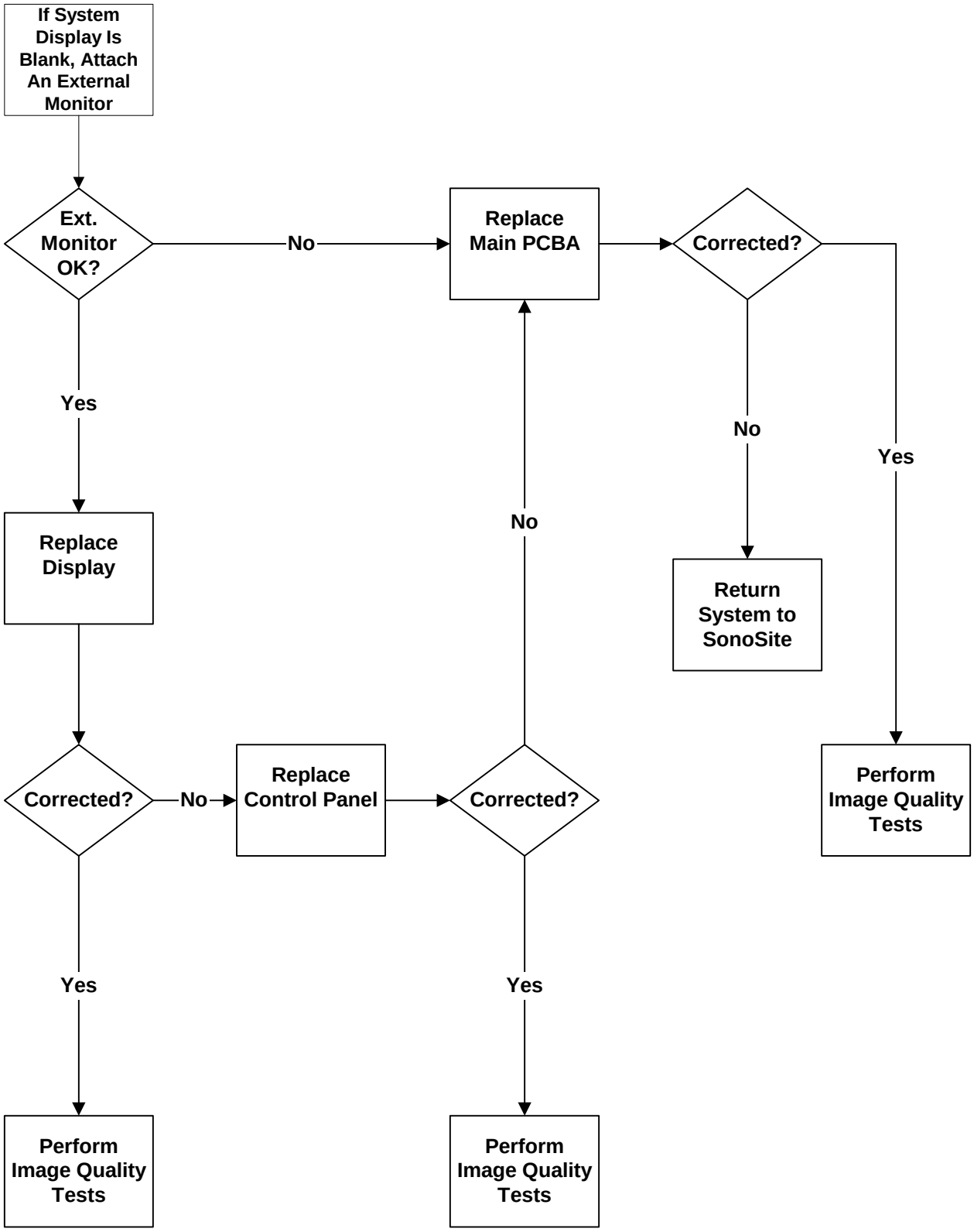


Figure 6.2 Display Diagnosis

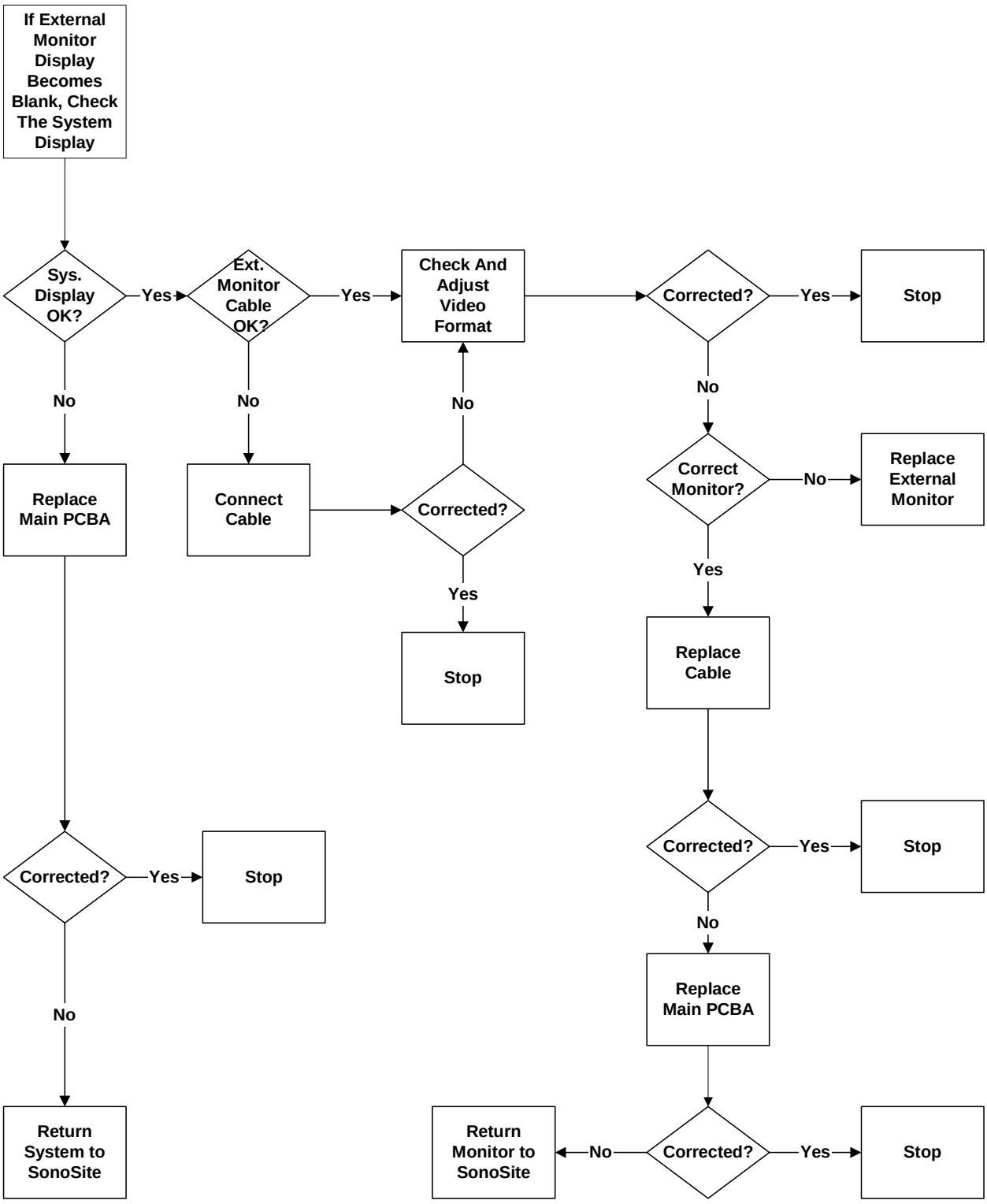


Figure 6.3 External Monitor Diagnosis

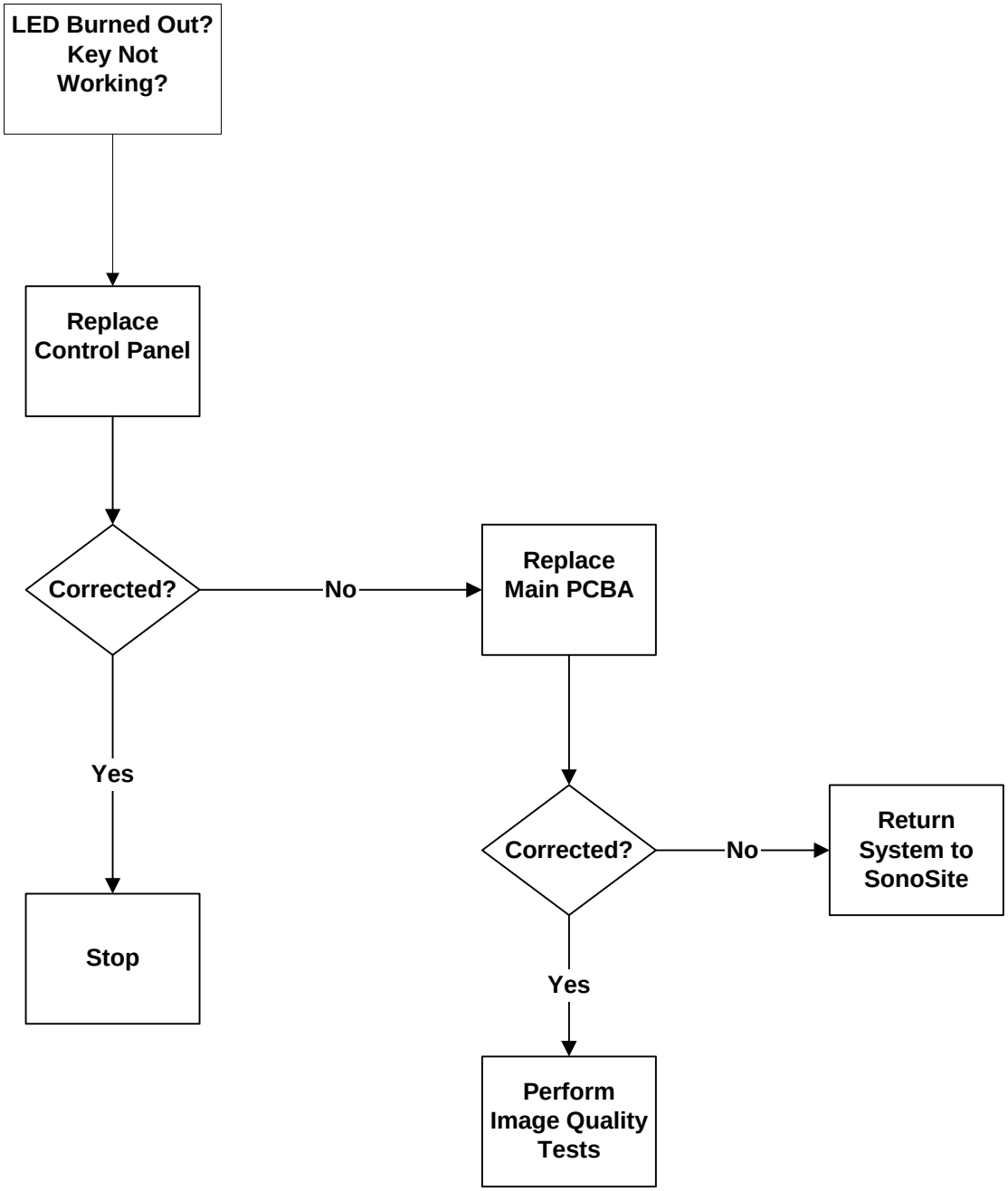


Figure 6.4 Keyboard Diagnosis

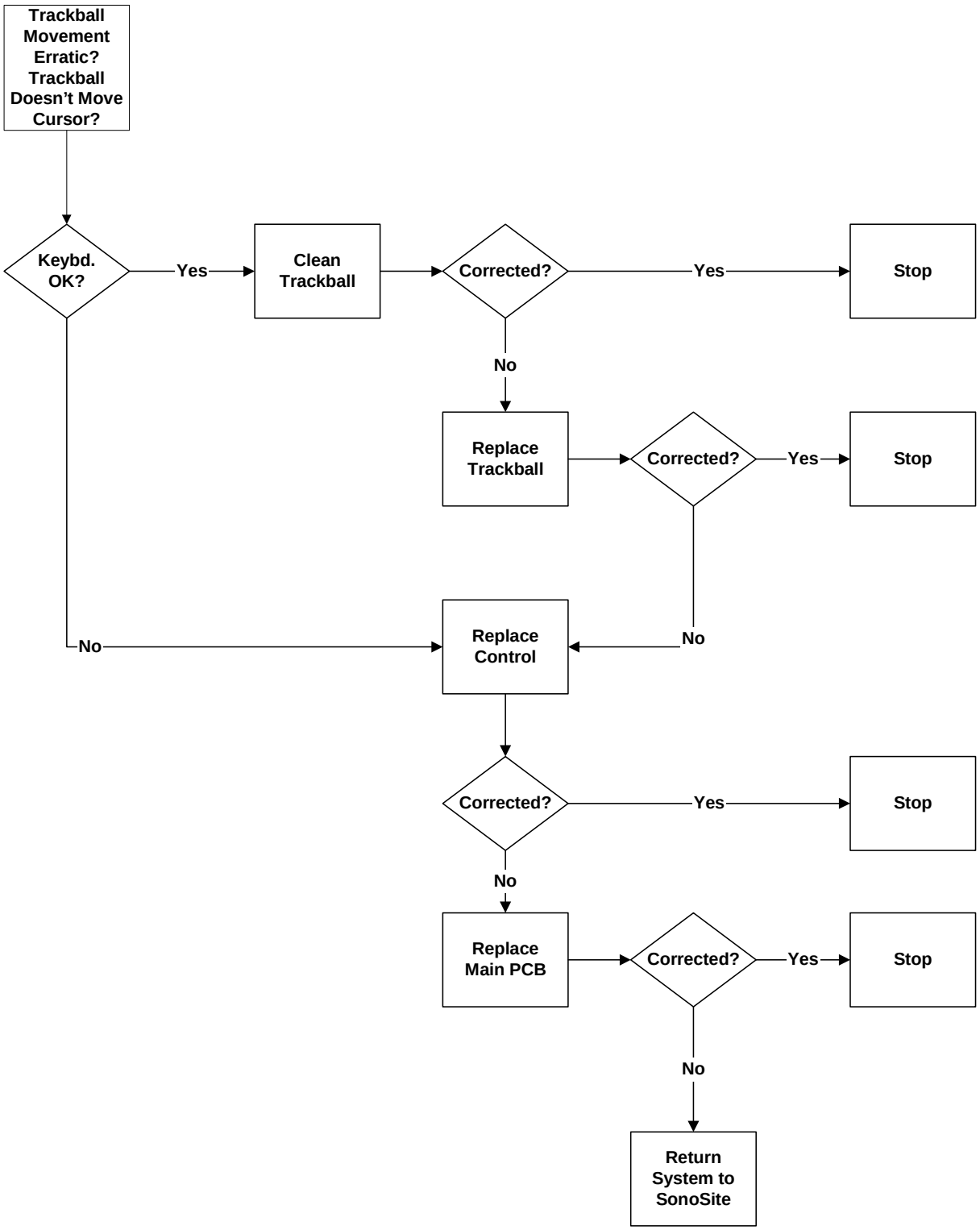


Figure 6.5 Trackball Diagnosis

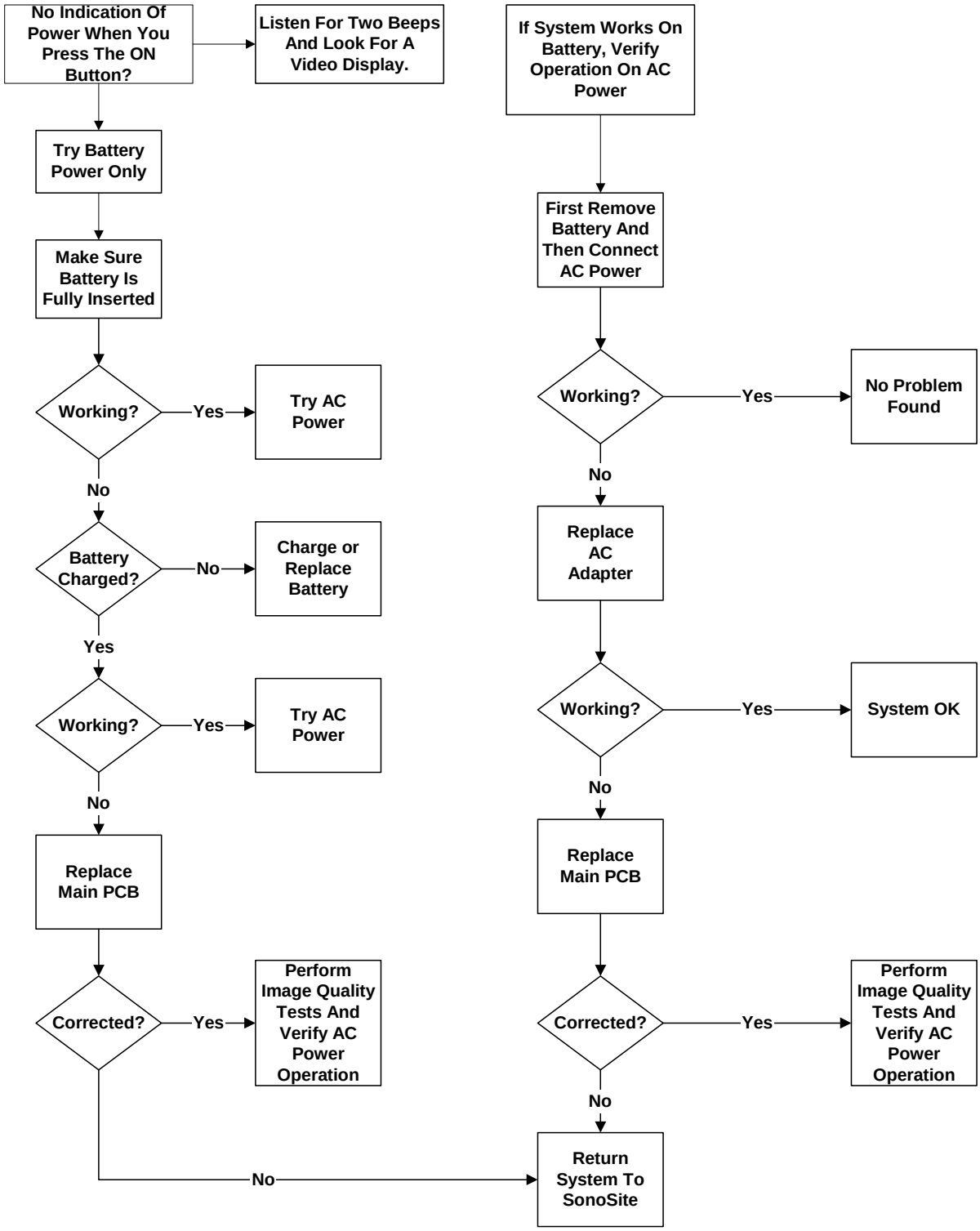


Figure 6.6 System Diagnosis

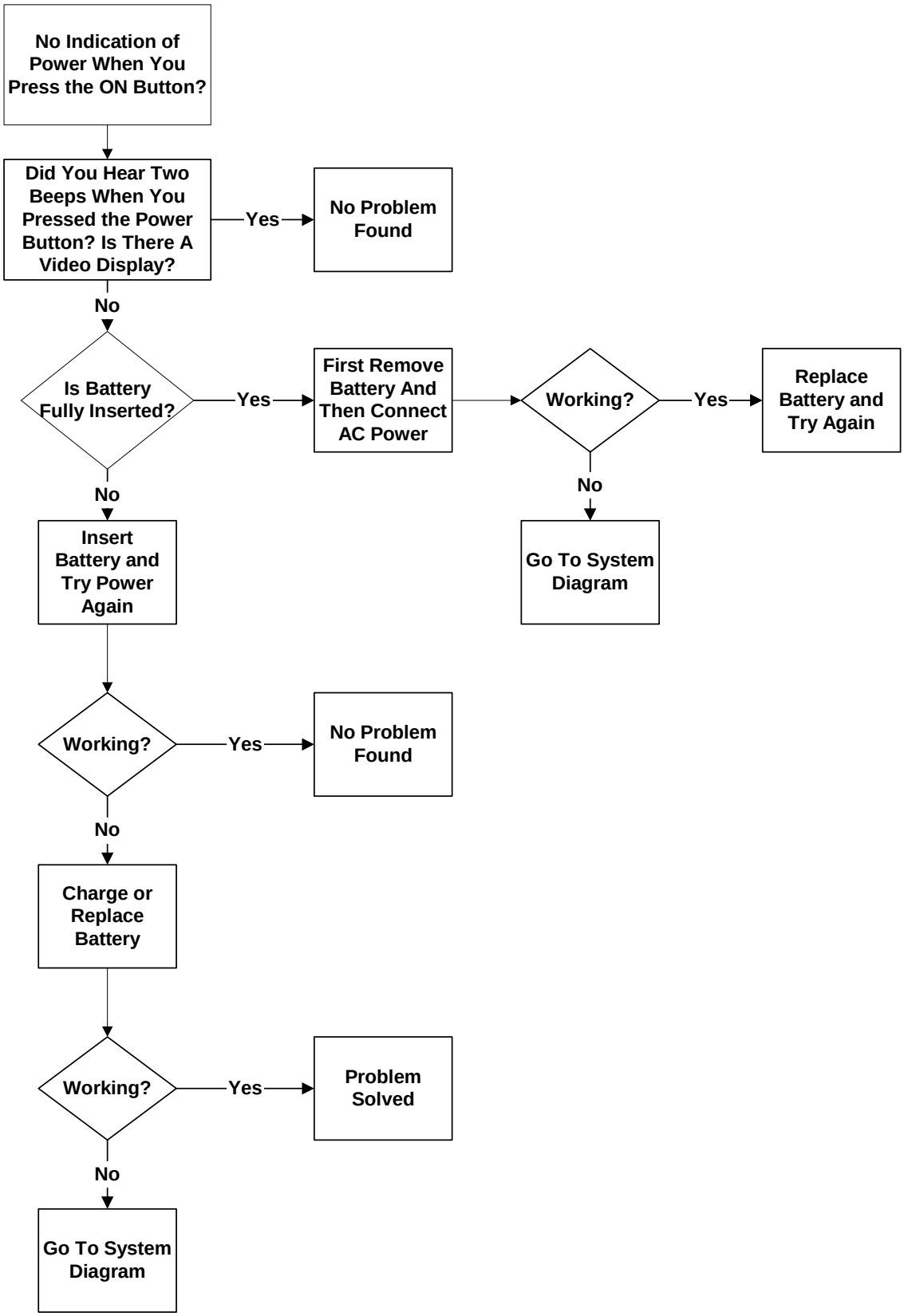


Figure 6.7 Battery Diagnosis

CHAPTER 7

Replacement Procedures

7.1 Display

*Note: Consult **Chapter 6,** Troubleshooting before making any repairs.*

7.1.1 Required Parts

- Service Assembly, Display, SonoSite 180 (P00747-01) or
- Service Assembly, Display, SonoHeart (P01015-01)

7.1.2 Required Tools and Materials

- A #1 Phillips screwdriver, 7.0 in. (17.8 cm / 177.8 mm)
- A torque driver, 2.0–10.0 in./lb (.23–1.1 newton meter)
- An anti-static mat
- A wrist grounding strap

CAUTION: Always use correct ESD procedures. ESD damage is cumulative and may not be noticeable at first. ESD symptoms may be first exhibited as a slight degradation of performance or image quality.

7.1.3 Removing the Display

1. Press the battery release on the lower right side of the system to remove the system battery.
2. Use a #1 Phillips screwdriver to remove the two screws in the battery compartment, which releases the Control Panel from the top housing (Figure 7.1).

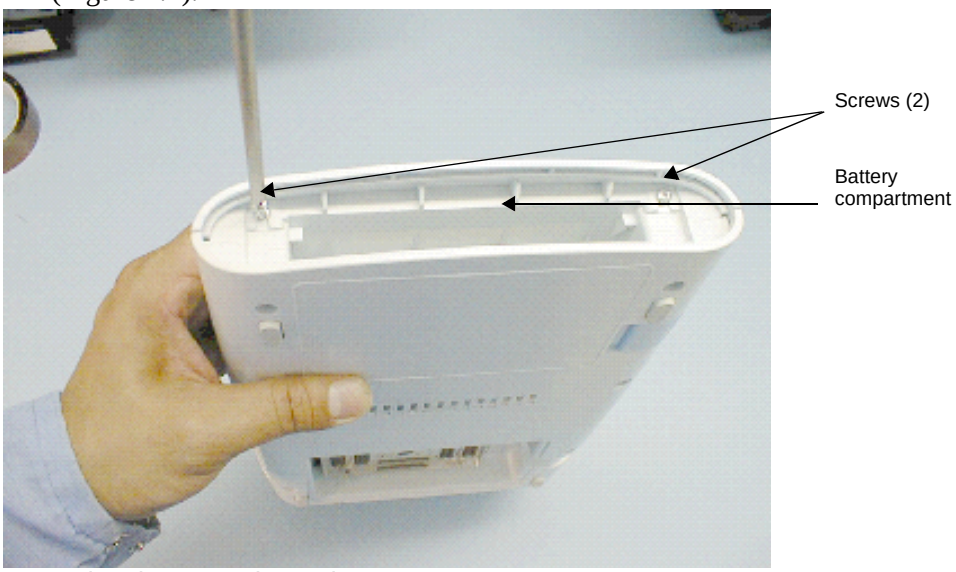


Figure 7.1 Removing the Control Panel

3. Insert an anti-static mat between the Control Panel and the Display to prevent damaging the Display (Figure 7.2).
4. Lay the Control Panel over onto the Display to expose the wire harness and flex circuits.
5. Carefully disconnect the 100-pin flex circuit from the bottom module.
6. Disconnect the Display Wire Harness and flex circuits from the Control Panel (Figure 7.2).
7. Set the Control Panel aside.

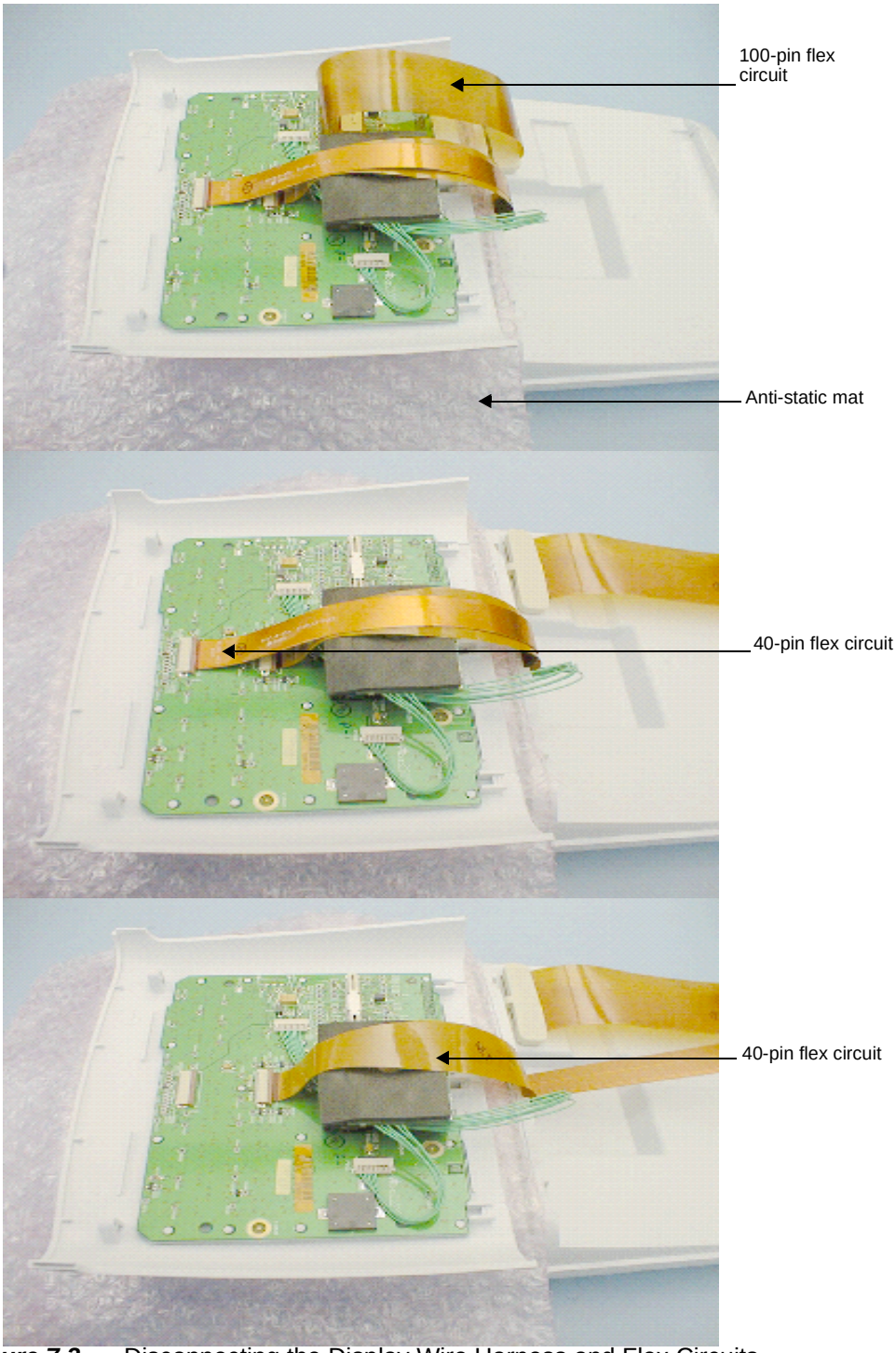


Figure 7.2 Disconnecting the Display Wire Harness and Flex Circuits

8. Use a #1 Phillips screwdriver to remove the four screws securing the Display hinges to the top housing (Figure 7.3).

9. Carefully guide the ends of the Display Wire Harness and two 40-pin flex circuits out through the slot in the top housing and remove the old Display.

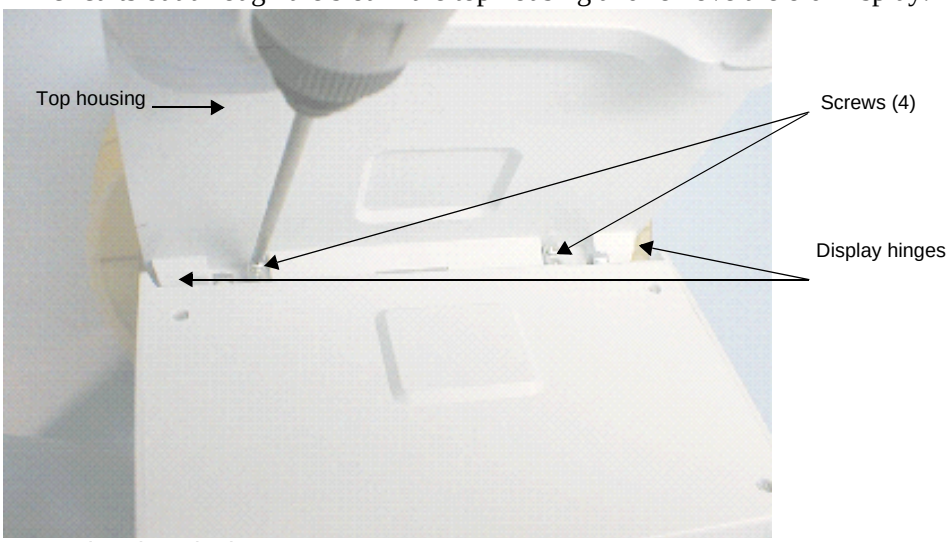


Figure 7.3 Removing the Display

7.1.4 Replacing the Display

1. Carefully guide the ends of the replacement Display Wire Harness and two 40-pin flex circuits through the slot in the top housing (Figure 7.4).

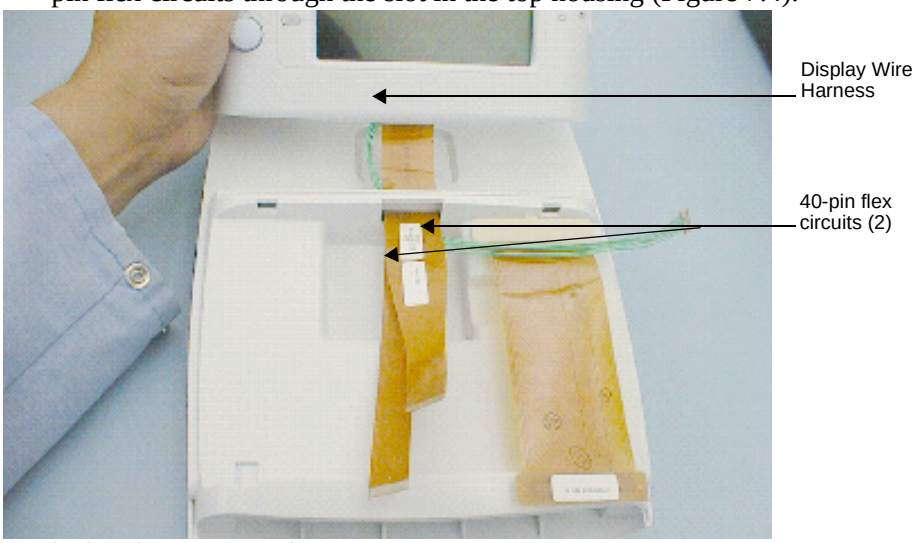


Figure 7.4 Replacing the Top Housing

2. Use a #1 Phillips screwdriver to secure the four screws on the replacement Display hinges to the top housing (Figure 7.3). Torque screws to 6.1 in./lb (0.7 newton meter).

3. Place the Control Panel onto the Display.

4. Install the Display Wire Harness and flex circuits.

5. Replace the 100-pin flex circuit on the bottom module (Figure 7.5).

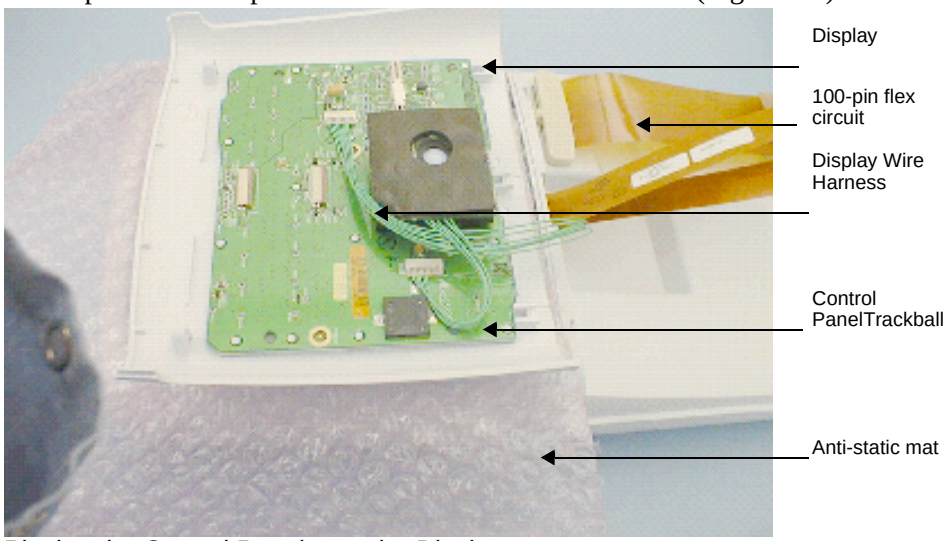


Figure 7.5 Placing the Control Panel onto the Display

6. Carefully replace the Control Panel by inserting the tabs on the top of the Display into the slots.
7. Set the Control Panel into place and replace the two screws inside the battery compartment (Figure 7.6). Torque screws to 7.1 in./lb (0.8 newton meter).
8. Place the battery in the battery compartment.
9. Turn on the system.
10. Verify that the Display is functioning properly by performing the Display tests in **Chapter 8,** *Performance Tests*.

7.2 Control Panel

7.2.1 Required Parts

- Service Assembly, Control Panel, English (P00735), or
- Service Assembly, Control Panel, French (P00736), or
- Service Assembly, Control Panel, German (P00737), or
- Service Assembly, Control Panel, Spanish (P00738), or
- Service Assembly, Control Panel, Portuguese (P00739), or
- Service Assembly, Control Panel, Italian (P00740), or
- Service Assembly, Trackball (P00741)

Note: The Service Assembly, Control Panel does not include a trackball. See ***Chapter 7.3,*** *Trackball to install a trackball.*

7.2.2 Required Tools

- A #1 Phillips screwdriver, 7.0 in. (17.8 cm / 177.8 mm)
- A torque driver, 2.0–10.0 in./lb (0.2–1.1 newton meter)
- An anti-static mat
- A wrist grounding strap

7.2.3 Removing the Control Panel

1. Press the battery release on the lower right side of the system to remove the system battery.
2. Use a #1 Phillips screwdriver to remove the two screws in the battery compartment, which releases the Control Panel from the top housing (Figure 7.6).

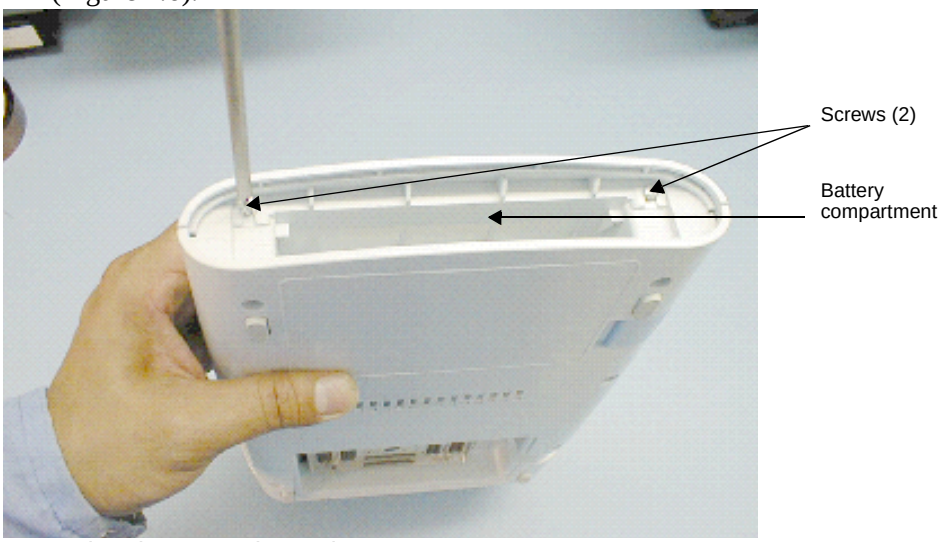


Figure 7.6 Removing the Control Panel

3. Insert an anti-static mat between the Control Panel and the Display to prevent damaging the Display.
4. Carefully lay the Control Panel over onto the Display to expose the Display Wire Harness and the two 40-pin flex circuits.
5. Carefully disconnect the 100-pin flex circuit from the bottom module.
6. Disconnect the Display Wire Harness and the two 40-pin flex circuits from the Control Panel (Figure 7.7).
7. Remove the Control Panel.

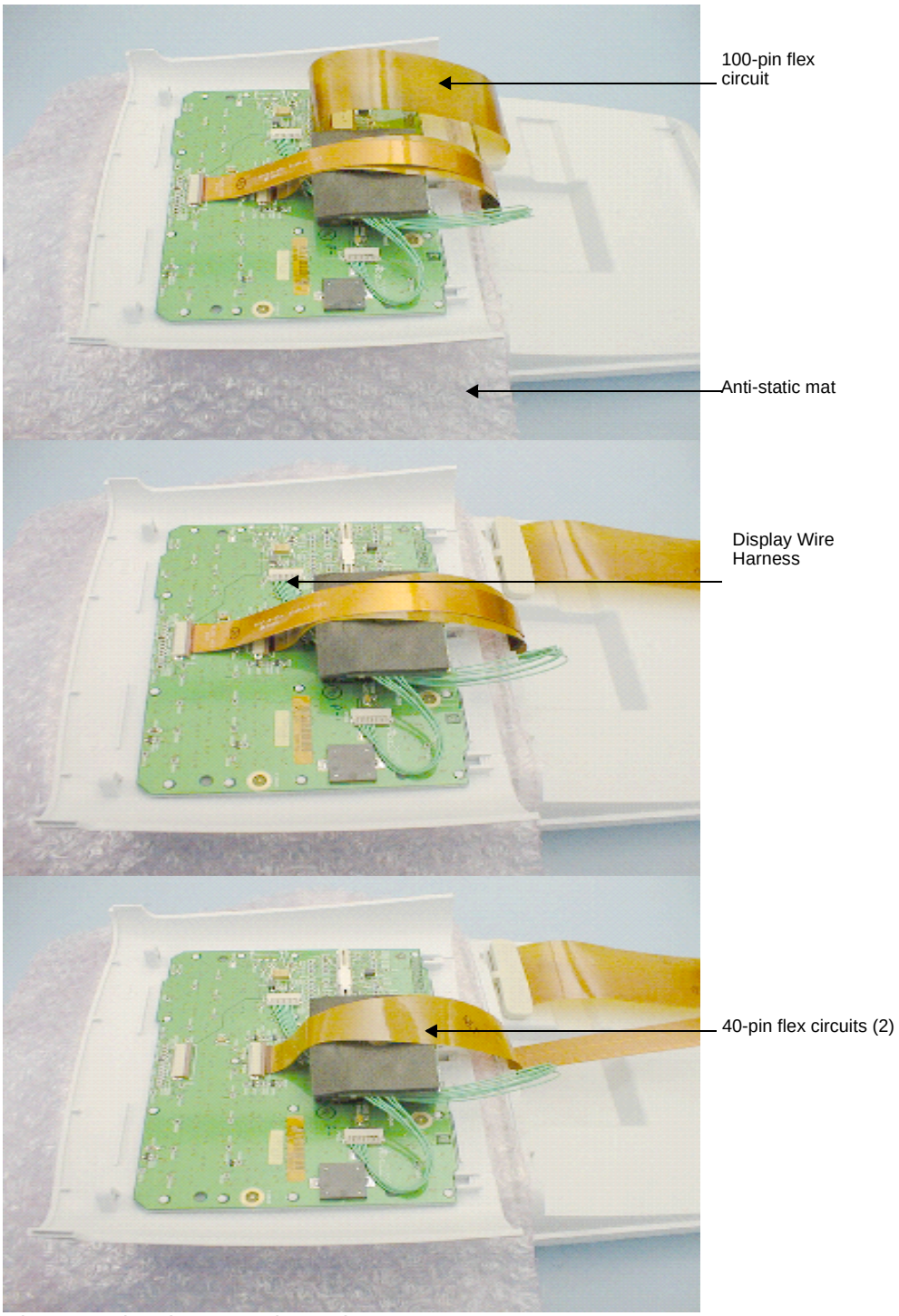


Figure 7.7 Disconnecting the Control Panel

7.2.4 Replacing the Control Panel

1. Place the Control Panel onto the Display.
2. Install the wire harness and the two 40-pin flex circuits.
3. Replace the 100-pin flex circuit on the bottom module (Figure 7.7).
4. Carefully replace the Control Panel by inserting the tabs on the top of the assembly into the slots.
5. Set the Control Panel into place and use a #1 Phillips screwdriver to replace the two screws inside the battery compartment. Torque the screws to 7.1 in./lb (0.8 newton meter) (Figure 7.8).

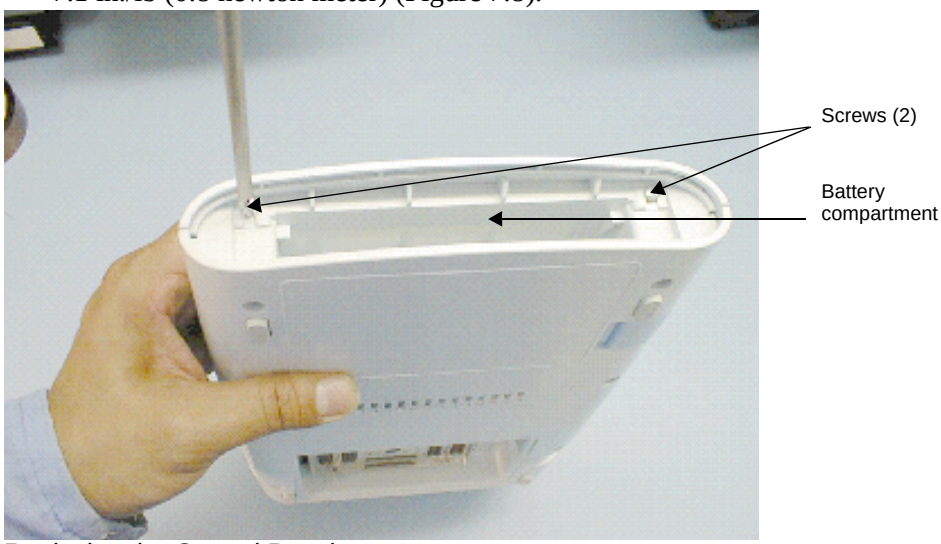


Figure 7.8 Replacing the Control Panel

6. Place the battery in the battery compartment.
7. Turn on the system.
8. Perform the Control Panel tests in **Chapter 8,** *Performance Tests* to verify proper operation of the new Control Panel.

7.3 Trackball

7.3.1 Required Parts

- Service Assembly, Trackball (P00741)

7.3.2 Required Tools

- A #1 Phillips screwdriver, 7.0 in. (17.8 cm / 177.8 mm)
- A torque driver, 2.0–10.0 in./lb (0.2–1.1 newton meter)
- A small, blunt punch
- An anti-static mat

- A wrist grounding strap

7.3.3 Removing the Trackball

1. Press the battery release on the lower right side of the system to remove the system battery.
2. Use a #1 Phillips screwdriver to remove the two screws in the battery compartment, which releases the Control Panel from the top housing (Figure 7.8).
3. Insert an anti-static mat between the Control Panel and the Display to prevent damaging the Display.
4. Lay the Control Panel over onto the Display to expose the wire harness and flex circuits.
5. Carefully disconnect the 100-pin flex circuit from the bottom module.
6. Disconnect the Display Wire Harness and the two 40-pin flex circuits from the Control Panel.
7. Remove the Control Panel.
8. Remove the trackball retaining ring. Carefully insert the tip of a blunt punch into the indent, turn the trackball retaining ring slightly counterclockwise. This will release it and allow you to remove it (Figure 7.9).

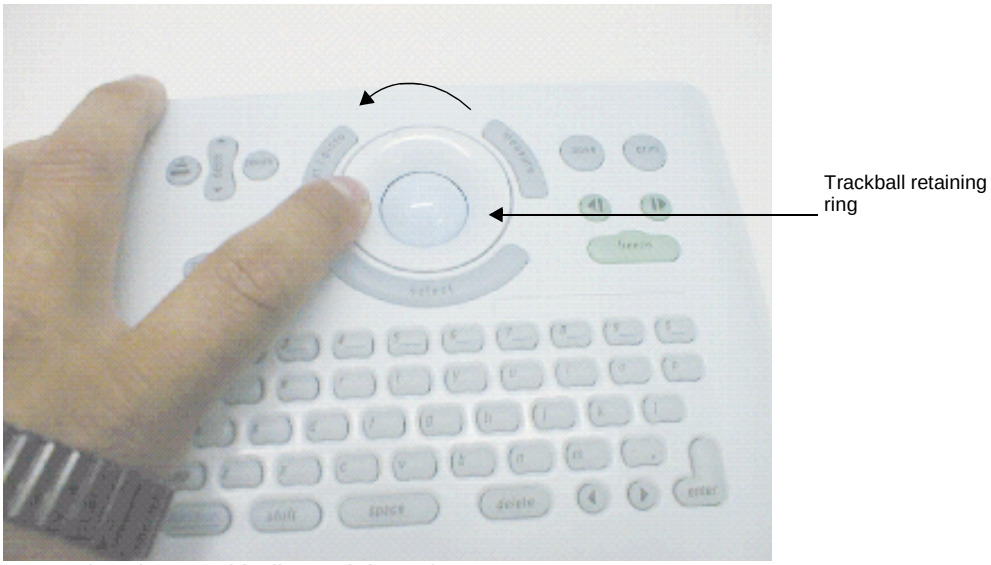


Figure 7.9 Removing the Trackball Retaining Ring

9. Remove the trackball.
10. Remove the Trackball Wire Harness from the Control Panel.

11. Remove the foam backing from the Trackball to expose the four screws connecting the Trackball to the Control Panel (Figure 7.10).

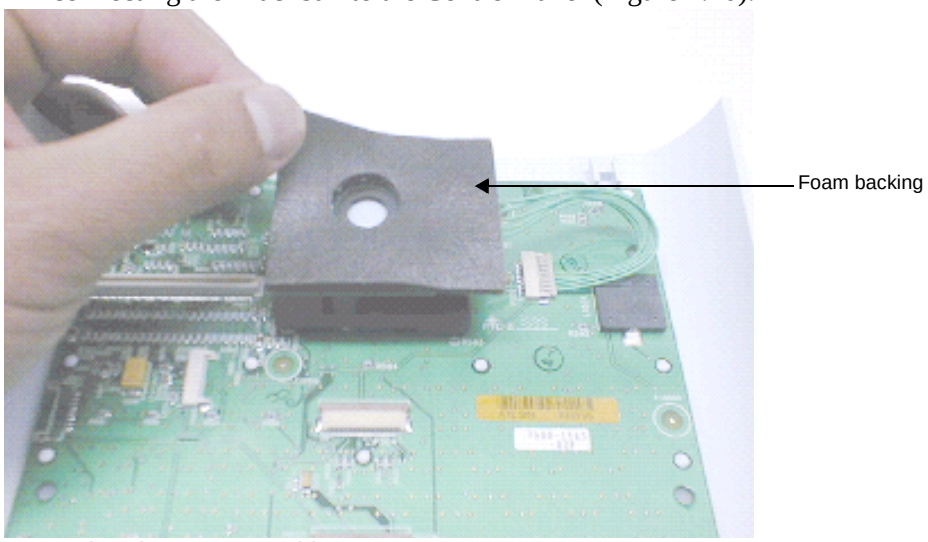


Figure 7.10 Removing the Foam Backing

12. Use a #1 Phillips screwdriver to remove the four screws that secure the Trackball to the Control Panel (Figure 7.11).

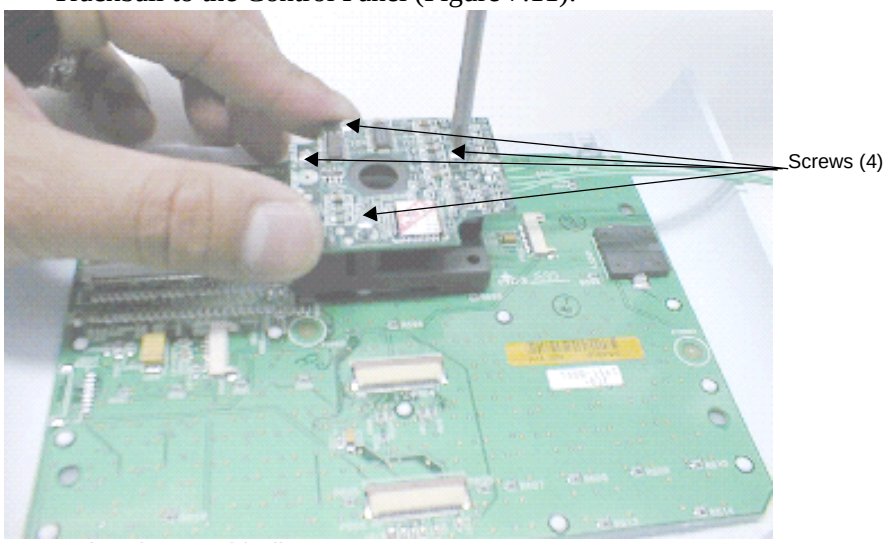


Figure 7.11 Removing the Trackball

13. Holding the Trackball in place, carefully turn the Control Panel over and allow the Trackball to drop off of the Control Panel, so as not to lose the pieces of the Trackball (Figure 7.12).

14. Remove the Trackball and note the locations of its components.

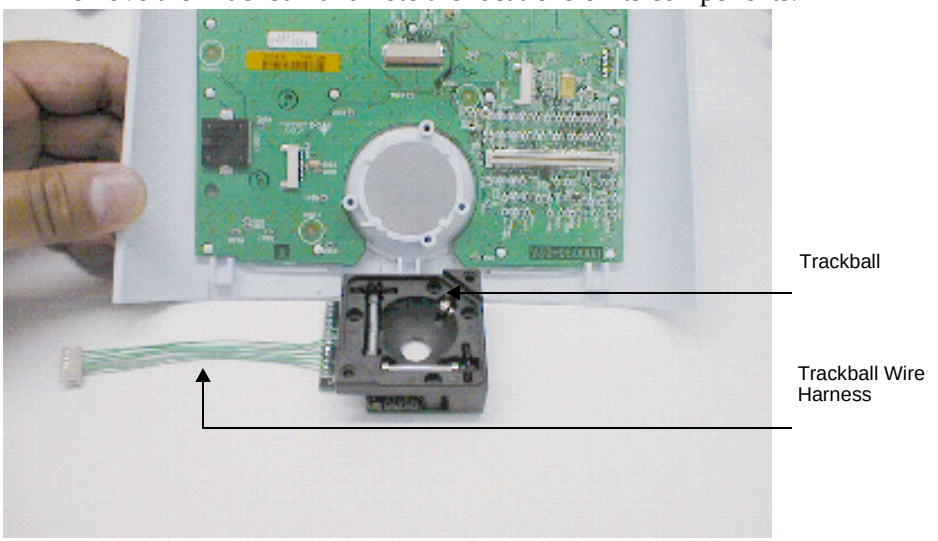


Figure 7.12 Removing the Trackball

7.3.4 Replacing the Trackball

1. Use a #1 Phillips screwdriver to remove the four screws holding the top cover onto the Trackball. Discard the cover and the four screws. Be careful not to tip the Trackball, which could cause the parts from the Trackball to spill (Figure 7.12).

2. Holding the Trackball, carefully turn the Control Panel over onto the new Trackball and set it into place.

3. Once in place, carefully turn the Trackball over holding the Trackball in place.

4. Use a #1 Phillips screwdriver to tighten the four screws securing the Trackball (Figure 7.13). Torque the screws to 3.6 in./lb (0.4 newton meter).

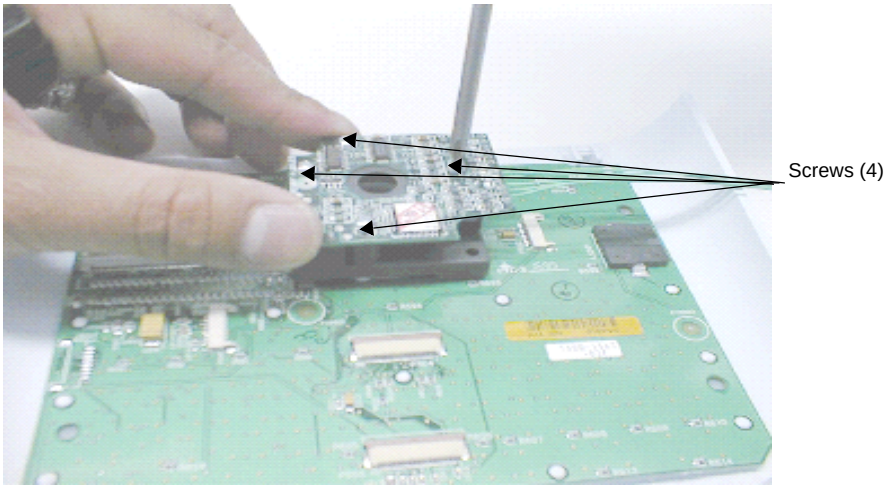


Figure 7.13 Securing the Trackball

5. Place the foam backing on the Trackball (Figure 7.14).

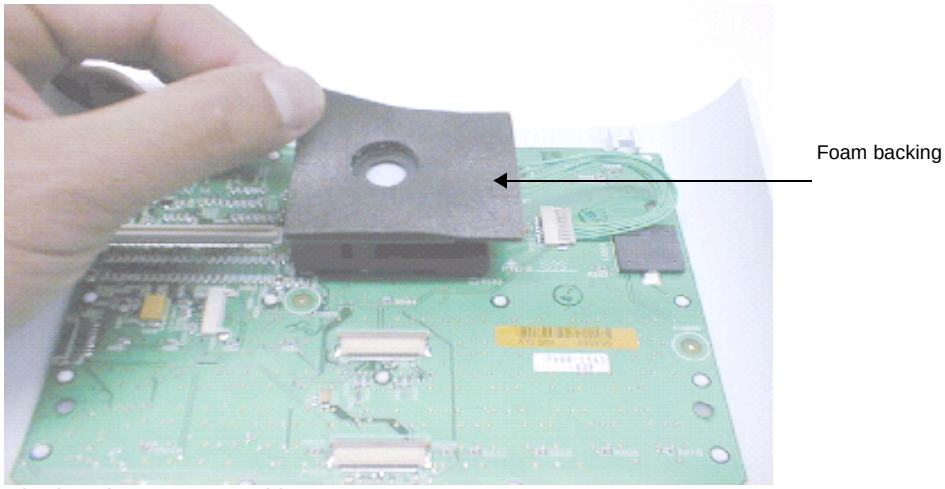


Figure 7.14 Placing the Foam Backing

6. Turn the Control Panel over and install the new trackball retaining ring. Use your fingers to press and turn the ring slightly clockwise until it locks into place (Figure 7.15).

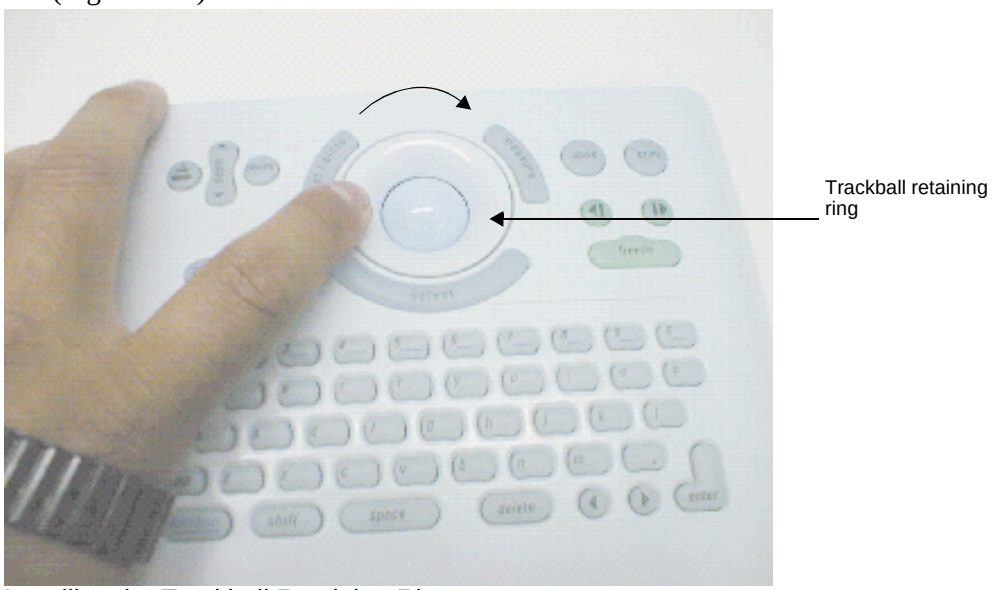


Figure 7.15 Installing the Trackball Retaining Ring

7. Turn the Trackball over and secure the Trackball Wire Harness to the Control Panel.

8. Place the Control Panel onto the Display.

9. Install the Display Wire Harness and the two 40-pin flex circuits (Figure 7.16).

10. Replace the 100-pin flex circuit on the bottom module.

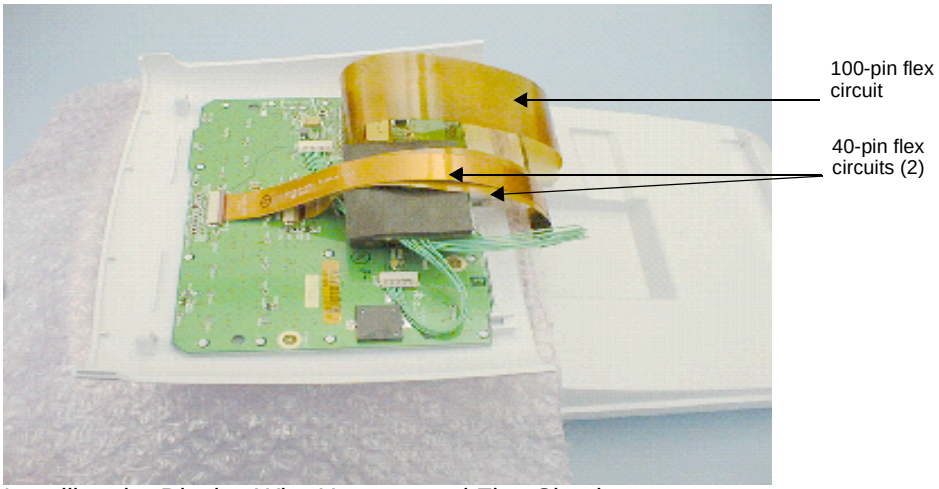


Figure 7.16 Installing the Display Wire Harness and Flex Circuits

11. Carefully replace the Control Panel by inserting the tabs on the top of the Control Panel into the slots.

12. Set the Control Panel into place and replace the two screws inside the battery compartment (Figure 7.17). Torque the screws to 7.1 in./lb (0.8 newton meter).

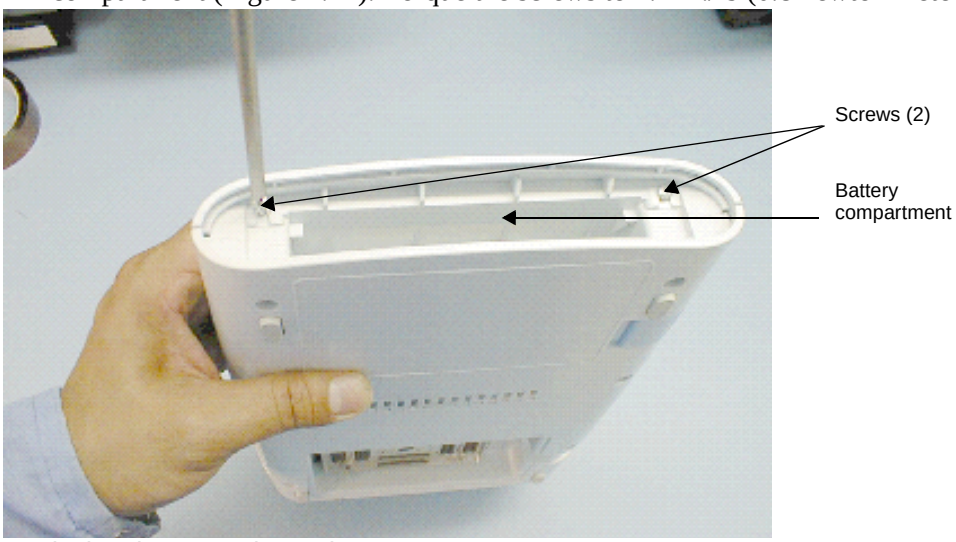


Figure 7.17 Replacing the Control Panel

13. Place the battery in the battery compartment.

14. Turn on the system.

15. Perform the trackball tests in **Chapter 8,** *Performance Tests* to verify the proper operation of the new trackball.

7.4 Main PCBA

7.4.1 Required Parts

- Service Assembly, PCB C1 Main, Color, English (P00749), or
- Service Assembly, PCB C1 Main, Color, French (P00751), or
- Service Assembly, PCB C1 Main, Color, German (P00753), or
- Service Assembly, PCB C1 Main, Color, Spanish (P00755), or
- Service Assembly, PCB C1 Main, Color, Portuguese (P00757), or
- Service Assembly, PCB C1 Main, Color, Italian (P00759), or
- Service Assembly, PCB C1 Main, Color, Japan (P01244)

- Service Assembly, PCB Main, SonoHeart, English (P01016), or
- Service Assembly, PCB Main, SonoHeart, French (P01214), or
- Service Assembly, PCB Main, SonoHeart, German (P01240), or
- Service Assembly, PCB Main, SonoHeart, Spanish (P01241), or
- Service Assembly, PCB Main, SonoHeart, Portuguese (P01242), or
- Service Assembly, PCB Main, SonoHeart, Italian (P01243)

7.4.2 Required Tools

- A #1 Phillips screwdriver, 7.0 in. (17.8 cm / 177.8 mm)
- A torque driver, 3.6 in./lb (0.4 newton meter)
- An anti-static mat
- A wrist grounding strap

7.4.3 Removing the Main PCBA

1. Press the battery release on the lower right side of the system to remove the system battery.
2. Place the system face down.

3. Use a #1 Phillips screwdriver to remove the eight screws securing the bottom housing to the top housing (Figure 7.18).

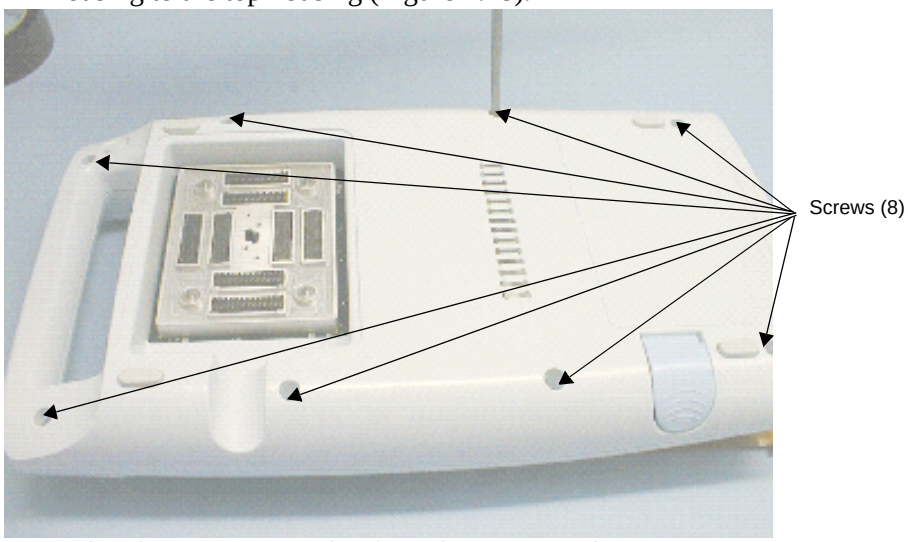


Figure 7.18 Removing the Bottom Housing from the Top Housing

4. Carefully lift the bottom housing from the top housing; do not damage the 100-pin flex circuit that connects the two together.
5. Disconnect the 100-pin flex circuit from the Main PCBA.
6. Remove the bottom housing that holds the Main PCBA.
7. Use a #1 Phillips screwdriver to remove the four screws that connect the Main PCBA to the bottom housing (Figure 7.19).

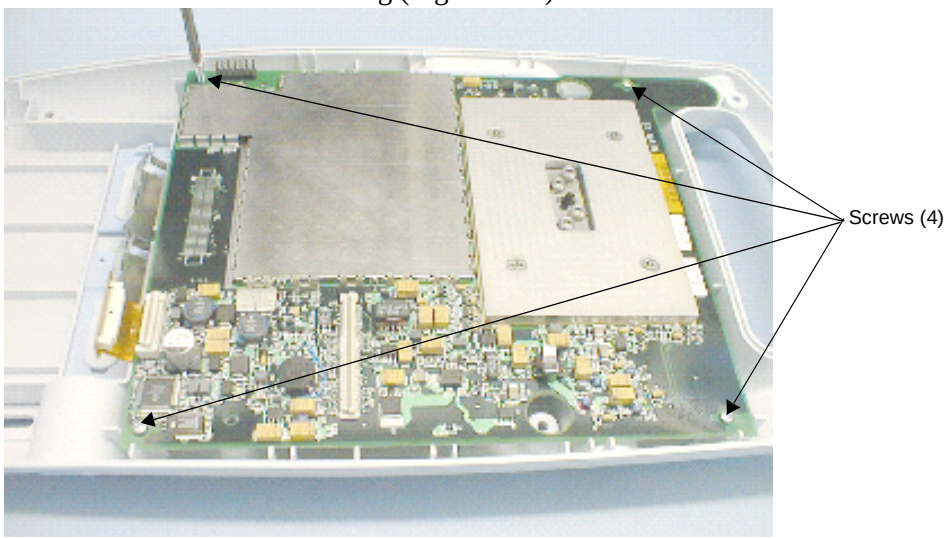


Figure 7.19 Removing the Main PCBA from the Bottom Housing

8. Carefully disconnect the 40-pin flex circuit that connects the Main PCBA to the Dock Interface PCBA (located under the Main PCBA).
9. Remove the Main PCBA.

7.4.4 Replacing the Main PCBA

1. Set the replacement Main PCBA onto the bottom housing (Figure 7.20).

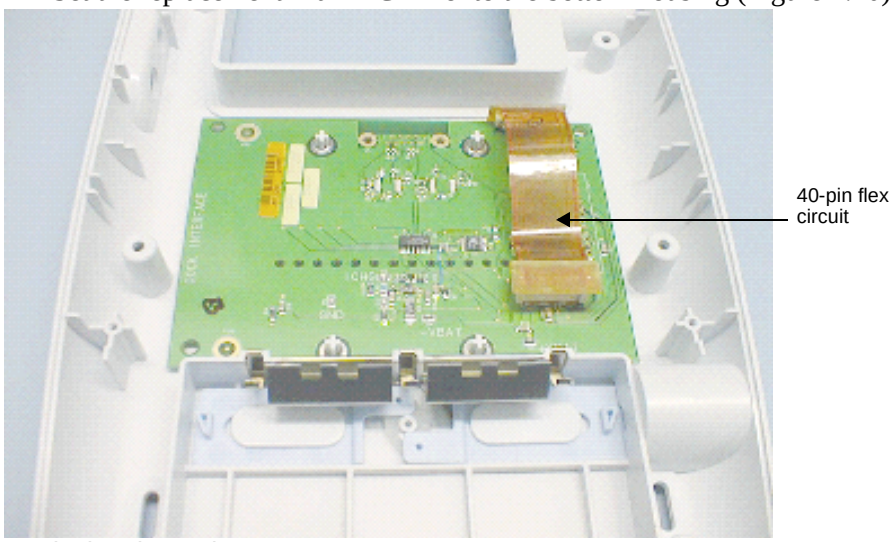


Figure 7.20 Replacing the Main PCBA

2. Secure the four screws that connect the Main PCBA to the bottom housing (Figure 7.21).Torque the screws to 3.6 in./lb (0.4 newton meter).
3. Connect the 40-pin flex circuit to the Main PCBA.
4. Carefully set the top housing onto the bottom housing, connecting the 100-pin flex circuit as it sets into position (Figure 7.22).

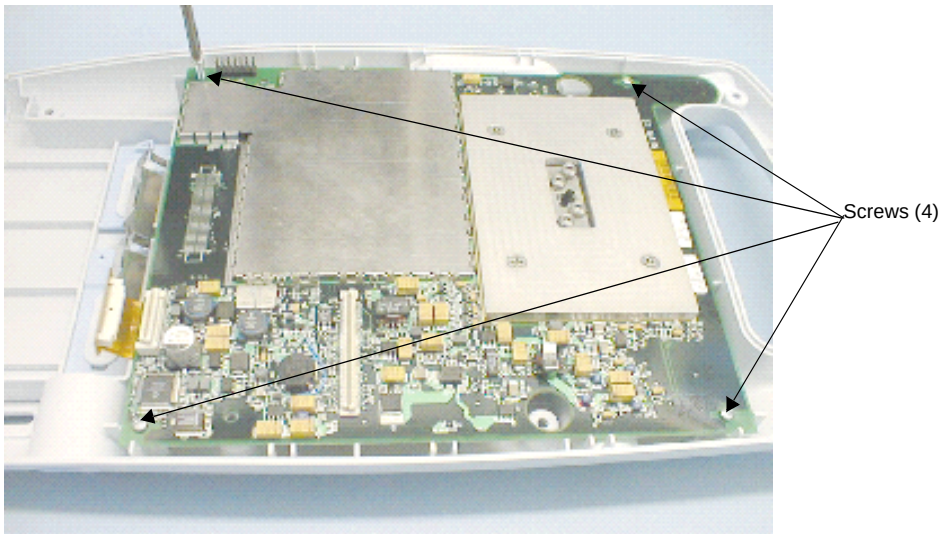


Figure 7.21 Securing the Main PCBA to the Bottom Housing

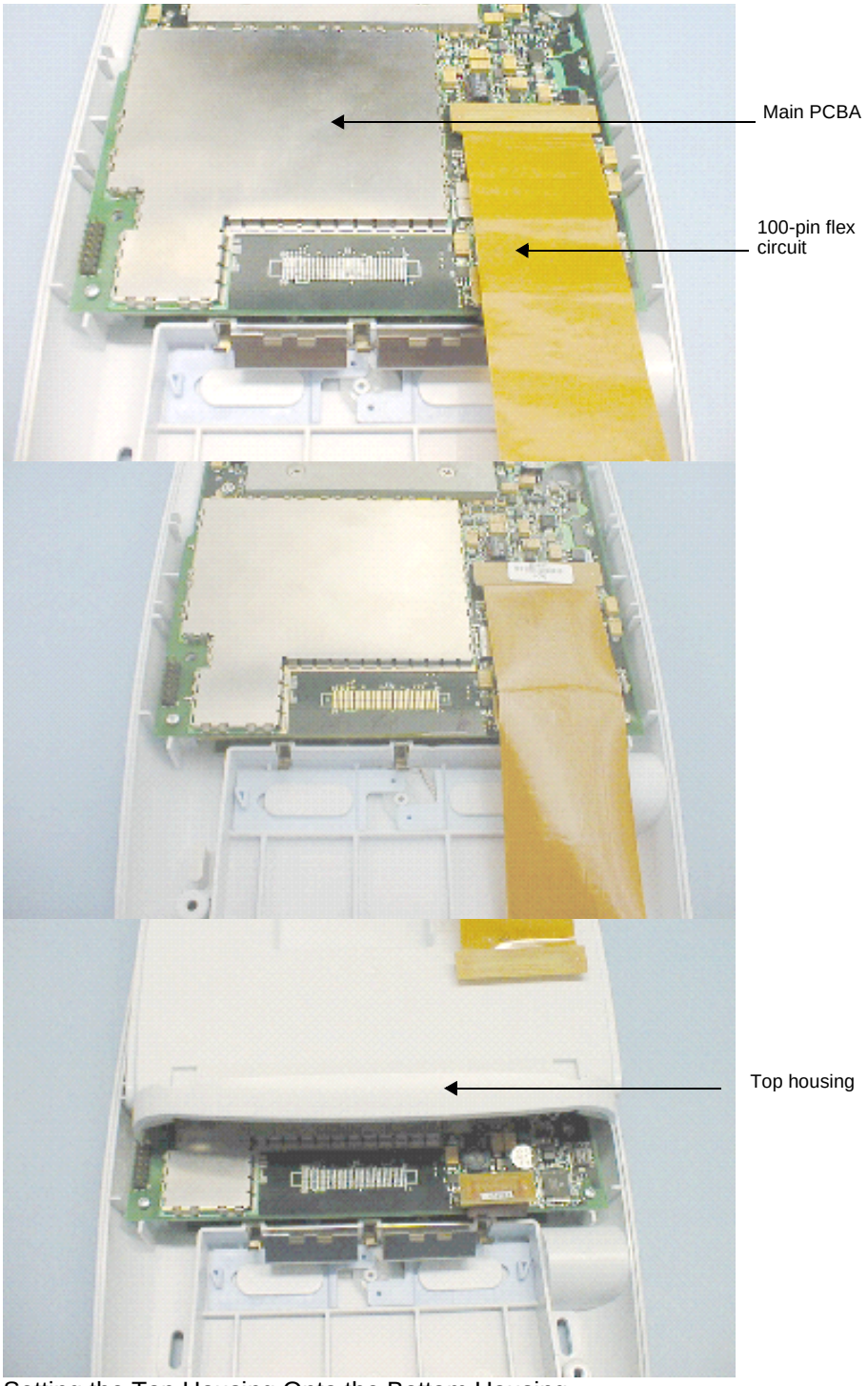


Figure 7.22 Setting the Top Housing Onto the Bottom Housing

5. Carefully mate the bottom housing to the top housing and use the #1 Phillips screwdriver to secure the eight screws (Figure 7.23). Torque the screws to 7.1 in./lb (0.8 newton meter).

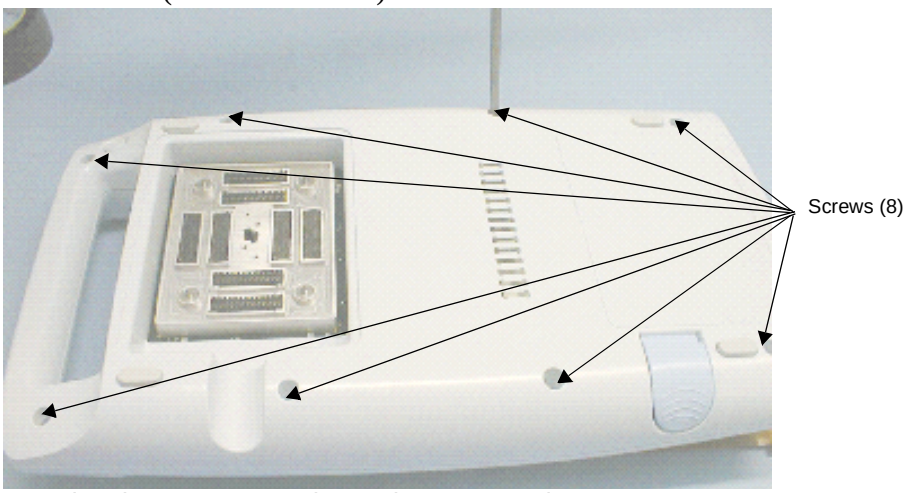


Figure 7.23 Securing the Bottom Housing to the Top Housing

6. Place the battery into the battery compartment.
7. Turn on the system.
8. Verify that the Main PCBA is functioning properly by performing the tests in **Chapter 8,** *Performance Tests*.

Note: Call SonoSite technical support or contact your local representative.

7.5 Transducers

There are no user-serviceable parts identified for the transducers.

7.6 SiteStand Mobile Docking Station

Except for the fuse, there are no user-serviceable parts identified for the SiteStand mobile docking station.

7.7 SiteCharge Dual Battery Charger

There are no user-serviceable parts identified for the SiteCharge dual battery charger.

7.8 AC Power Supply

There are no user-serviceable parts identified for the AC power supply.

7.9 Peripherals

If you need assistance in locating a service center near you, contact SonoSite technical support.

7.9.1 Monitor

To return a failed monitor, contact the Sony Service Center at 714-220-9100. Ship to the original OEM for service or send Sony monitors to the following address:

Sony Service Center
10833 Valley View
Cypress, CA 90630
United States

7.9.2 VCR

To return a failed VCR, contact the Sony Service Center at 800-282-2848 or 972-931-2497. Ship to the original OEM for service or send Sony VCRs to the following address:

Sony Electronics, Inc.
7517 Campbell Road
Dallas, TX 75248
United States

7.9.3 Printer

To return a failed printer, contact the Sony Service Center at 770-263-9888. Ship to the original OEM for service or send Sony printers to the following address:

Sony Service
3175 A Northwood Parkway
Norcross, GA 90071
United States

CHAPTER 8

Performance Tests

8.1 Overview

WARNING: **Critical Test Function -** A failure of the system function tested in this section could adversely affect safety or effectiveness of the system. While performing the steps in this section, verify that the images on the system display and on the external monitor are acceptable.

- Verify that all controls operate smoothly over their full range and that the system responds properly.
- To obtain 2D images, SonoSite recommends using the RMI 413A Soft Tissue Phantom, the RMI 403 GS Multipurpose Phantom, or the equivalent.
- To obtain Power Doppler images, SonoSite recommends using the RMI 425 Doppler Phantom, the RMI 1425A Doppler, or the equivalent.
- When making penetration measurements on a phantom, apply the phantom reference value and tolerance to the measurement.

8.2 Test Equipment:

- SonoSite ultrasound system with a C60/5-2 MHz transducer
- RMI 413A Soft Tissue Phantom, the RMI 403 GS Multipurpose Phantom, or the equivalent.
- RMI 425 Doppler Phantom, the RMI 1425A Doppler, or the equivalent.
- Acoustic gel

8.3 Setting Up Performance Tests

To set up the performance tests:

1. Attach the C-60 transducer to the system.
2. Select **general** for optimization and **OB** for exam type.
3. Couple the transducer to the 413A phantom, adjusting gain settings and transducer for a proper phantom image (e.g., pins are high level echoes positioned in straight lines; cysts are sonolucent, edges are sharp, and graphite particles of the phantom are mid grays).

8.3.1 Scan Reference Orientation

1. Verify that the correct transducer name appears in the upper right corner of the system display.
2. Verify that the scan plane orientation mark in the image located near the skinline corresponds to element #1 on the transducer. This can be tested by putting your finger on the probe and running it across the transducer face. Your finger touching the transducer face as indicated above should show up at the orientation mark on the image format on the monitor.
3. With the array pointing down and the orientation mark to the operator's left, element #1 corresponds with the left side of the array.

8.4 Testing 2D Performance

To test 2D performance:

1. Use a C60/5-2 MHz transducer in 2D mode.
2. Adjust the position of the C60/50-2 MHz transducer on the RMI 413A Soft Tissue Phantom or the RMI 403 GS Multipurpose Phantom.
3. Use the 2D system controls to obtain an image that clearly shows both the horizontal and vertical rows of pins.

8.4.1 2D Image Quality

To test 2D image quality:

1. Verify the ultrasound image appears uniform in both the axial and lateral direction without any dropouts or intensity variations.
2. Verify the cystic structure at the focal zone is clearly differentiated from the surrounding tissue and is echo-free; while solid tissue, with numerous echo sources, appears solid.

8.4.2 Axial Measurement Accuracy

Note: Measurements must be performed while the image is frozen.

To test axial accuracy:

1. Acquire the image.
2. Press **freeze**.
3. Press **measure**. Two calipers appear on the image display. A menu appears on which are listed two **distance** icons, an **ellipse** icon, a **delete** icon, and a **calcs** icon, if applicable. (If the **caliper line** setup is on, then a dotted line connects the two calipers. See the *SonoHeart Ultrasound System User Guide*, if necessary.) The first caliper in the menu is active by default.
4. Use the **trackball** to position one of the calipers.
5. Press **select** to fix the caliper and enable the other caliper.
6. Use the **trackball** to move the other caliper. The results update as you move the caliper, and the measurement is complete when you finish moving the calipers. (Press **select** to alternate the active caliper, and adjust the measurement with the **trackball**.)
7. You can perform another distance measurement on the image by selecting the other **distance** icon and repeating the preceding steps.
8. Measure the distance, center to center, of two pins that are 5-12 cm apart vertically.
9. Verify the distance measured is within the tolerance listed in Table 8.1.

8.4.3 Lateral Measurement Accuracy

To test the lateral measurement accuracy:

1. Perform steps 1 through 7 in *Section 8.4.2*.
2. Measure the distance, center to center, of the two pins that are 4-10 cm apart horizontally.
3. Verify the distance measured is within the tolerance listed in Table 8.1.
4. Press **freeze** to return the system to live 2D mode.

Table 8.1 System Measurement Accuracy

MEASUREMENTS	TOLERANCE
Axial Distance	+/- 2%
Lateral Distance	+/- 2%

8.4.4 Penetration

To test penetration:

1. Adjust the system controls to obtain an image that clearly shows the limits of echo penetration (Table 8.2).
2. Measure from the center of the skinline to the deepest vertical position—where the scatter echoes start to break up and tissue definition is lost.

Table 8.2 Imaging Performance

IMAGING PERFORMANCE	C60	ICT	C15
2D Penetration	11.5 cm	6.0 cm	19.0 cm

8.5 Additional Performance Tests

8.5.1 Color Power Doppler (CPD)

To test CPD:

Note: Use the RMI 425 Doppler Phantom or the RMI 1425A Doppler Phantom.

1. Connect any transducer and set up the system for CPD mode.
2. Press and release **function**.
3. Press and release **0**. The CPD image appears. (In CPD imaging, repeat these steps to return to 2D imaging.)

   To move the CPD image:

   - Use the **trackball** to move the CPD image. While you are moving the CPD image, you will see an outline of the new position moving on the display. When you stop moving, the new position will display the CPD image. (The size of the CPD image is fixed. There is no control with which to change it.)

   To adjust CPD gain:

   - Turn **gain** clockwise to increase the amount of CPD gain. (While in CPD imaging, **near** and **far** affect only the 2D image; they do not affect the CPD image.)
   - Turn **gain** counterclockwise to decrease the amount of CPD gain.
4. Image the vessel using a Doppler phantom. Verify that as the gain controls are increased and decreased, there is a corresponding increase and decrease in the Doppler echo intensity. Verify that there is no flow outside of the vessel.
5. Save a CPD image by pressing **freeze** and then **save**.

8.5.2 Image Quality Verification Test

To test the image quality:

- Products that have had subassemblies replaced, or have otherwise been disassembled, must have an Image Quality Verification Test performed.
- The Image Quality Verification Test should be performed after successful completion of *Section 8.3* and *Section 8.5.1*.
- It should be completed before returning the system to service.
- It must be performed by a certified sonographer.

8.5.3 Image Review

Review all saved images and verify that the images are displayed properly.

8.5.4 Printer

To test printer operation:

1. Print two images in rapid succession and verify proper operation.
2. Verify the print control receptacles on the system and on the stand are functioning correctly.

8.5.5 Battery Charging

To test battery charging operation:

1. Insert a battery into the system.
2. Remove AC power from the system AC power connector.
3. Press and hold the **power** switch to turn the system on. Allow the battery to discharge. The battery indicator LEDs (to the right of the display) extinguish from top to bottom as the battery discharges.
   Note: The battery may take 1–2 hours to discharge.
4. Re-attach the AC power cord to the AC power connector.
5. Note that the battery indicator LEDs light from bottom to top as the battery charges.
6. If charging is not evident within 30–60 minutes, refer to **Chapter 6,** *Troubleshooting* for troubleshooting procedures.

8.5.6 Video Output

CAUTION: The video output at the video receptacle can only be verified using the recommended video monitor, printer, or VCRs.

To test the video output:

1. Attach an external video monitor to the video connector using the video cable.
2. Turn on the system power and verify that the video on the external monitor matches the video on the system display.
3. If the video does not appear similar, or there is no display on the external monitor, refer to **Chapter 6,** *Troubleshooting* for troubleshooting procedures.

8.6 Returning Products to SonoSite

8.6.1 Contacting SonoSite Technical Support

For technical support of any SonoSite product, do one of the following:

- If you are an international customer, call 1-425-951-1330.
- If you a U.S. customer, call 1-888-482-9449, extension 2513 (toll-free).
- Connect to SonoSite on the World Wide Web at www.sonosite.com.
- Send e-mail to service@sonosite.com

You need to provide the following information by telephone or e-mail:

- Contact name and phone number
- Product name
- Serial number
- Description of the problem

8.6.2 Shipping Instructions

A return material authorization number (RMA) is obtained by contacting SonoSite. Do not return products without first contacting SonoSite.

APPENDIX A

Parts List

This section contains a list of common, field-replaceable parts. The parts are listed at the recommended replacement level.

A.1 Replacement Parts List

The following tables contain all the replaceable parts for the SonoSite ultrasound system. All quantities are one unless otherwise noted.

A.2 Ordering Replacement Parts

To order parts, call SonoSite Customer Service at 1-425-951-1330.

Note: The following illustrations are for reference only. They are not to scale.

A.3 Display

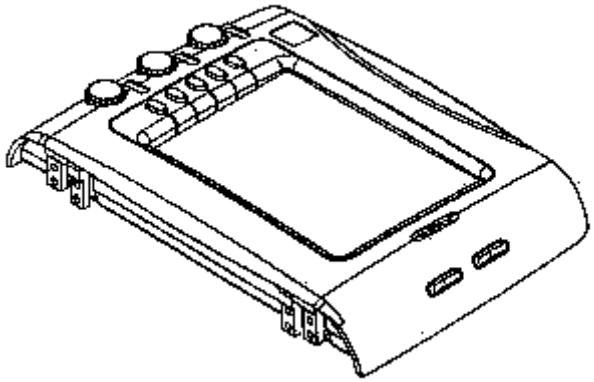


Table A.1 Display

PART NUMBERS	DESCRIPTION
P00747	Service Assembly, Display, SonoSite 180
P01015	Service Assembly, Display, SonoHeart

A.4 Control Panel

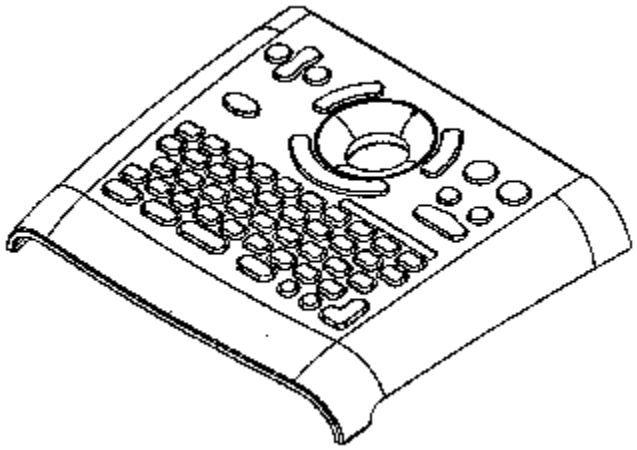


Table A.2 Control Panel

PART NUMBERS	DESCRIPTION
P00735	Service Assembly, Control Panel, English
P00736	Service Assembly, Control Panel, French

Table A.2 Control Panel, *Continued*

PART NUMBERS	DESCRIPTION
P00737	Service Assembly, Control Panel, German
P00740	Service Assembly, Control Panel, Italian
P00739	Service Assembly, Control Panel, Portuguese
P00738	Service Assembly, Control Panel, Spanish

A.5 Trackball

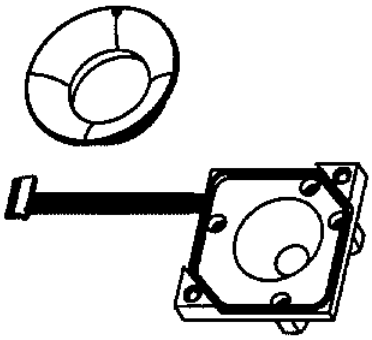


Table A.3 Trackball

PART NUMBERS	DESCRIPTION
P00741	Service Assembly, Trackball

A.6 Main PCBA

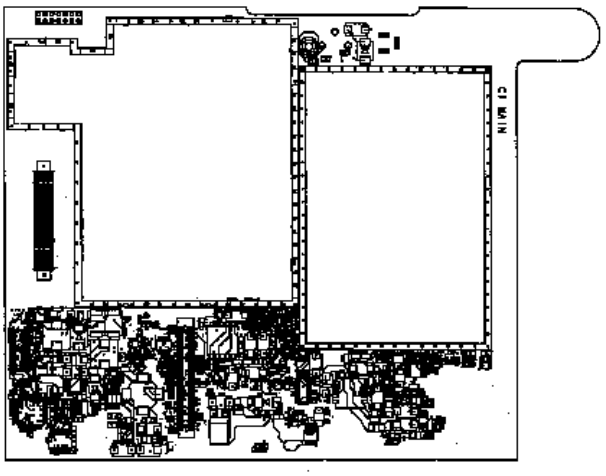


Table A.4 Main PCBA

PART NUMBERS	DESCRIPTION
P00749	Service Assembly, PCB C1 Main, Color, English
P00751	Service Assembly, PCB C1 Main, Color, French
P00753	Service Assembly, PCB C1 Main, Color, German
P00755	Service Assembly, PCB C1 Main, Color, Spanish
P00757	Service Assembly, PCB C1 Main, Color, Portuguese
P00759	Service Assembly, PCB C1 Main, Color, Italian
P01244	Service Assembly, PCB C1 Main, Color, Japanese
P01016	Service Assembly, PCB Main, SonoHeart, English
P01214	Service Assembly, PCB Main, SonoHeart, French
P01240	Service Assembly, PCB Main, SonoHeart, German
P01241	Service Assembly, PCB Main, SonoHeart, Spanish
P01242	Service Assembly, PCB Main, SonoHeart, Portuguese
P01243	Service Assembly, PCB Main, SonoHeart, Italian

A.7 Additional Spare Parts

Table A.5 Additional Spare Parts

PART NUMBERS	DESCRIPTION
P00536	Video Cable, Printer
P00537	Control Cable, Printer
P00049	Battery Pack
P00538	Power Supply
P00301	Assembly, Flex Circuit 40-pin
P00029	Assembly, Flex Circuit 100-pin
P00806	Knob, TGC Assembly
P00343	Hinge, Display
P00318	Flex Circuit, Display
P00364	Connector, Interposer
P00611	Assembly, Flex Circuit, Frame

APPENDIX B Service Event Report

The Service Event Report provides information about product failures to the manufacturer and to authorized service facilities, which provide approved warranty services for SonoSite products.

Return a copy of the form to the following address:

SonoSite, Inc.
Technical Support
19807 North Creek Parkway, Suite 200
Bothell, Washington 98011-8214

telephone: 1-425-951-1330 (international customers)
1-888-482-9449, extension 2513 (U.S. customers)

facsimile: 1-425-951-1201

e-mail: service@sonosite.com

Service Event Report

SonoSite

Service Provider

Name:	Date:
Company:	
Address:	
Phone Number:	Fax Number:
E-mail address:	

Device Description

Name:	Serial Number:	
Part Number:	Lot Number:	Revision:
Software Version:	Other Identifiers:	

Event Description

Diagnosis

Service Performed

Performed By:	Date:
Actions:	

Parts Removed

Part Name	Part Number	Serial Number	Lot Number	Rev	Replaced By

Parts Installed

Part Name	Part Number	Serial Number	Lot Number	Rev	Replaced By

Tests Performed (attach test data)

Test:	Test:
Performed By:	Performed By:
Result: Pass ☐ Fail ☐	Result: Pass ☐ Fail ☐

Attach additional sheets as required

.

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